FOOD INDUSTRIES

OMES OF FAMOUS FOODS...PET MILK CO., DELTA, OHIO

IN THIS ISSUE:

Determining Foreign Matter in Flour

Removal of Lead from Maple Sugar

How to Use Dextrose in Canning

What Makes a World's Fair Exhibit Click

U. S. Standards for Grades of Dried Prunes

McGRAW-HILL PUBLISHING COMPANY, INC.

How a 3-cent stamp brought real dollar savings in carton costs

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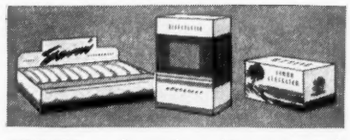

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In THIS *Issue*

• DO WORLD'S FAIRS PAY?

The answer to that one is that they do, if the exhibitor knows what he wants to accomplish and how to set about doing it. This was proved many times by the experiences of exhibitors at last year's Fair in New York, as set forth beginning on page 44 of this issue of Food Industries. The facts given in the article are the result of an intensive study of the 1939 Fair and should be a distinct aid to 1940 exhibitors. In the second half of this article, next month, we will go behind the facts and show what were the characteristics of both successful and unsuccessful food exhibits.

• GOOD NEWS FOR TIRED JAWS

Anyone who ever wore down his teeth trying to make away with a really tough steak will welcome the good news set forth in the article beginning on page 49. In this article, the authors summarize research results which show that freezing makes beef tenderer. And they also give such practical details as what temperature to use and what other factors affect beef tenderness.

• WHAT COLOR IS A DRIED PRUNE?

Up until September 11, 1939, a dried prune was any color that a dried prune took on in the process of drying. But now there is an official U. S. standard. Prunes, under the skin, are now supposed to assume a shade between Mirador Brown and Golden Rod Yellow. The colors are shown on pages 46 and 57 of this issue.

• THAT SEARCHING EYE

Each year the microscope assumes a more important rôle in the quality control of food products. Butter, cream and tomato products are recent examples. Now flour takes its turn. The method is set forth on page 36 in an article showing how to determine the presence of "foreign" matter in flour.

• HOLD THAT FLAVOR!

No factor in the quality control of food products is of greater importance than the retention of fresh flavor—right onto the consumer's table. Food processors are continually working on this matter of flavor preservation and step by step the problems involved are being solved. This month, Food Industries carries two stories on the subject. On page 39 is shown how speed in processing preserves fresh flavor in ice cream. And on page 42 appears the story of a new bag that preserves the fresh flavor in coffee and similar products.

In FORTHCOMING *Issues*

• FAT IS IN THE FIRE

Some of the most bitter commercial and technical battles of recent years have centered around the competion between the various edible oils and fats. Political allies have been enlisted on both sides. Producers and users of non-edible oils and greases have entered the fray. The firing has threatened to become general. An eye-witness report of the warfare commences in a coming issue of Food Industries. The outcome of this struggle is fraught with consequences for all food processors. Better read the communiques.

• PICKLES AGAIN

After the flurry of Christmas and New Year's business, once more we swing back to normal and one sign of that will be another installment of W. G. Wormley's series on pickling, which distills, as it were, the essence of a lifetime in the business. The author knows how and tells all.

• AN OUNCE OF PREVENTION

It is a very simple thing to avoid spoilage of processed foods and all the costly consequences that follow spoilage. Merely keep the bacteria out! Sounds easy, but all food processors well know what a difficult job it is. Help in keeping out the bacteria will be given by Food Industries in the near future in the form of an article on plant sanitation by two well known authorities. With quality control and the F.&D.A. such important factors in food processing success, this article should bear fruit for most food manufacturers.

• PACKAGING LOOMS

Early each Spring food men and all others whose interest centers on packaging gather at the American Management Association's annual packaging conference and its accompanying exhibit of packaging materials and machines. The dates this year are March 26 to 29.

So look for us at the Hotel Astor in New York on March 26 where Food Industries' editors will be on the lookout to welcome you. And look in the March Food Industries for a group of helpful articles on packaging problems. Also, don't neglect to provide time to attend the packaging clinics where practical men discuss practical problems in a practical way.

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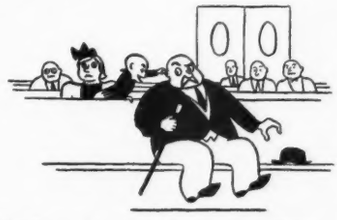
The Talk of the Industry

» ONE of the inspiring sights at the recent Chemical Show was the group of spectators and exhibitors waiting in line for a chance to place a tired foot on a vibrating barrel packer. It turned out to be a very soothing experience for convention feet.

» PROFESSIONAL CONSUMERS and their immediate followers have developed a new strategy: that of going to Federal informal hearings on food standards with babies in their arms. Presumably the motive for taking along the tiny tots is to impress the Standards Committee with the sublimity of their task in writing tentative food standards.

One of the interested spectators representing a large food company found it a bit difficult to follow the testimony because a happy child immediately behind him developed an amazing curiosity about the structure of the gentleman's ear.



Verily, the standards hearings are getting tougher and tougher.

» IN 1940 you will see several articles about dehydration — mainly dehydration as a method of preservation. This is our contribution to military preparedness in the U. S., for the War Department is studying the matter very seriously. But there is not very much known about how to run a dehydration business at a profit.

» "A DICTATOR is but the receiver of a bankrupt nation," said Senator B. K. Wheeler to the National Association of Manufacturers.

That sentence explains in a few words the principal force in the current history of this unhappy world.

» PETER CAILLER KOHLER Swiss Chocolates Co. and Bedford Products Co. are complimented for their respective contributions to better flavored foods. The former's 7-oz. bar of Nestle's semi-sweet chocolate carries a household recipe for Toll House Chocolate Cookies that are an exceptionally tasty morsel of unusual characteristics. And Bedford's high flavored jellies are equally good. In fact their Wild Blackberry jelly is just about tops.

» IF YOUR BUSINESS is in the South, where the price of cotton determines the level of prosperity, you may wonder why your consuming public is not doing as well by you as consumers in other parts of the country. Lay a considerable part of it to the low price of English currency. When the pound Sterling is worth only $3.94 in U. S. money, it means that sellers of cotton to the U. K. must take a considerable cut, or else no sale. If the British pound were up to parity with the U. S. dollar, about $4.80, cotton would be worth nearly two cents a pound more than it now commands. And those two cents may mean the difference between prosperity and depression for cotton growers and food manufacturers.

What reasons the British Government has for allowing the pound Sterling to remain where it has been since the war began are not wholly apparent. One suspects, however, that it is to force English purchases to the British Dominions where their currencies are tied to the pound instead of the dollar.

» REPORTS on the examination of foods, as put out by the state of Connecticut, are always interesting reading. Especially No. 1131 in the latest report, May, 1939, as follows:

"Cinnamon Rolls, submitted by a police officer. The rolls were suspected because of a burning sensation produced in the mouth. A cinnamon-sugar mixture used in making rolls of this type was submitted with the sample, but the rolls submitted were found to be sprinkled with ginger instead of cinnamon."

» SOMEBODY residing in Washington has proposed that chewing gum manufacturers should offer a small sum for the return of used and slightly

used chewing gum. This would aid in keeping city sidewalks clean and, he slyly adds, the great gobs of gum could be exported to belligerent nations for use as tank traps. Not a bad use for old gum. But what a weapon of propaganda it would give to those who dislike gum chewing. One can visualize a fatal whispering campaign about its probable use for remanufacture if that repurchase solution were ever put into effect.

Euphemism Wanted

OUR lack of inventiveness in the field of euphemism is deplorable. Yet, let it not be said that flour is less sacred than dairy products. With due deference to squeamish sensibilities of some of our cash customers, a careful search was made to discover a suitable euphemism (a euphemism, if you care to know, is a nice word that means something else, like perspire, make, unswallow, etc.) for insect excreta in the title of the article on flour infestation in this issue. "Sediment" would not do because flour cannot be treated by filtration. So "Foreign matter" was selected.

What's the Matter With the Wagner Law?

ONE MIGHT truthfully paraphrase the age old query: "What's the matter with Christianity?" and its equally old answer: "It hasn't been tried," with respect to the National Labor Relations Act. You will recall that its avowed purpose is to promote peaceful labor relations, but nearly all fair-minded persons will agree that it hasn't been tried—at least, not much.

At this stage of our history, the Nation needs administrative personnel who will administer the laws, rather than impose their pet ideas on others by going as far beyond the letter and spirit of the laws as they dare. Administrators are needed who accept their jobs as duties to be performed in accordance with written instructions, not as opportunities to exercise their personal desires and theories.

To recommend less bias in administration is, however, not to overlook the obvious defects in the law. Nevertheless, the Act itself is not anywhere near as bad as the NLRB zealots have construed it. That both faults shall soon be corrected is an imperative necessity.

Anticipated Legislative Trend

VIGOROUS RENEWALS of domestic reform effort must be expected now that Congress has finished its neutrality job and has been at home for the holidays. The very persistent, though wholly sincere, desire of New Dealers in Washington to improve the conditions of the under-privileged will become evident in new efforts. Many of these will appear in a patriotic costume, looking like national defense of preparedness movements. Some of the projects will continue in the re-employment garb. Very few will be dressed in a frank New Deal costume. There is nothing ulterior about this. It is characteristic of political effort. But those who do not understand it simply do not understand Washington, either motives, methods, or results to be expected.

The food business is no exception to those varieties of important American enterprise which will have to study critically the events of the next six months. Fortunately, the prospect of fairly good business generally will make some of the continued reform movements less terrifying. Safety demands that all of them should be critically studied because they represent a continuance of the effort to centralize in Washington far more authority than has ever before been there. And the Washington authority, of course, is to be centralized as far as possible in the White House—if reformers have their way.

If one goes over the entire list of items which are likely to be taken up by Congress when it convenes in the first week of January, there are fundamentally no novel projects evident. More intimate regulations? More spending? Closer approach to price fixing? Yes, all of these. But no-

Hors d'Oeuvres

• A mechanical rat has been invented for use in analyzing vitamin G. As if, quadruped and biped together, there weren't enough rats in the world already.

• *Five trawlers from a Boston fishing fleet recently were sold to the French. These apparently were to be used as mine sweepers. Such is the difference in the purposes which boats serve on the two sides of the Atlantic. 'Tis indeed a vast ocean.*

• A man with Swift Canadian Co. drove a truck more than 400,000 miles in the busy traffic of Westminster, B. C., without so much as scratching a fender. But we'll bet ten to one that his private car is driven from the rear seat by his wife.

• *"Scientific Moderation in Drinking" is expounded in a new booklet issued by United Brewers Industrial Foundation. But we still like the practical plan of taking your liquor like a man, not like a storage tank.*

• A catchup advertiser finds that 107 brands of catchup are competing with each other in New England. 97 in New York and so on throughout the country. In other words, the catchup market is caught up.

• *Germany recently decreed that the people could buy only one egg a week. Well, we've seen eggs one of the like of which would pretty nearly satisfy your henfruit hunger for a month.*

• Frozen salmon steaks recently saved the life of an Eskimo woman, and the woman wasn't starving—she wasn't even hungry. She had acute appendicitis, no ice was available, and salmon steaks fresh from a Birds Eye froster at Unga, Alaska, were applied to hold death outside the door.

• *Two of the world's greatest scientists each made his greatest discovery in a brewery. Louis Pasteur developed the fundamental processes of pasteurization as a result of experiments to improve the quality of French beer. Joseph Priestly was led to the discovery of the principles of carbonation by watching bubbles rise in a brewery vat. Subsequent experiments with carbonation resulted in the priceless humanitarian boon of anesthesia and the discovery of oxygen.*

• An importer in Helsinki has been denied a license to handle American canned foods. These products are considered luxuries in Finland. Bear meat is the common diet there these days.

• *To improve their complexions, women in the Middle Ages put raw dough on their faces. Now the women put raw dough on the palm of a beautician.*

• Hot weather causes chickens to lay smaller eggs. Too bad summer doesn't have a similar effect on the size of the eggs laid by the plans of business men.

• *"The bi-decade mystery of the vanishing red salmon in Bristol Bay once more is rising on schedule to haunt the piscatorial sleuths of the Bureau of Fisheries and the salmon canning industry." So says a Bureau of Fisheries news release. Maybe Charlie Chan could help.*

• The new synthetic wool made from milk is destroyed by bacteria of the casein-splitting type, Dutch scientists find. The bacteria appear to liberate a chemical that attacks the wool. "For every cloth there is a moth."—Shapesfear.

F. K. L.

body can call any of this novel. Nor has any of it lost its serious significance for those who believe in retention of some of the old-fashioned principles which made a business man responsible for the making of business decisions.

Export Difficulties

AMERICAN FIRMS owning branches in Canada are having their troubles, especially when their Canadian branches are expected to export to Great Britain under Empire tariffs. The problem of these plants now is to obtain proper official approval to load their products on to ships. For Britain has classified all foods on the basis of necessity or luxury. Luxury cannot be shipped overseas.

At the time of our most recent information, the classification was a bit curious. Catchup and pork and beans were considered luxuries, forbidden to be shipped. On the other hand, canned fruit juices and tomato juice, also canned tomatoes, were necessities that could be freely shipped as fast as cargo space became available. One catchup manufacturer who normally ships about 1,000 carloads to England has, so far, been able to export less than a hundred cars.

Forehanded manufacturers in Canada and the United States realized that export restrictions would occur soon after war was declared. They shipped everything possible before submarine warfare began in earnest. Which was all to the good for Canadians. But U. S. firms will have Sterling credits when the goods are sold and these cannot be converted to dollars except at about a 25 per cent discount. So either they will have to wait a long time for U. S. cash, or take goods in trade. There are no 25 per cent profits in the food business.

Exporting is no trade for a novice.

Notice to Librarians and Researchers

THE system of numbering pages in FOOD INDUSTRIES that has been in use for eleven years has been changed. Beginning with Volume XII, the text and advertising pages are to be numbered consecutively, beginning with the front cover of every issue of the magazine. Heretofore the ad pages have been numbered separately from the text, but text pages have been numbered serially from page one throughout the year.

In the future it will be necessary to refer to the Number as well as Volume, Page, and Year in citing a reference.

Heat Sterilization in Bags Creates Technologic Problems

A NEW METHOD of canning has been proposed. The container is a flexible bag to be made of a transparent material, Pliofilm. Some of the publicity has been of the spellbound character and any food technologist will foresee the need for a great deal of additional as well as secondary information before he can be satisfied that the rather sketchy news stories are indicative of something more than the fact that courageous experimenters are trying out a new type of container.

Preservation of food by heat sterilization in hermetically sealed containers is nothing new. Nicholas Appert discovered the method over 120 years ago. Heretofore, however, all commercial canning has been done in rigid containers of metal or glass, or glass with metal closures. The flexible, transparent container is now undergoing test. It may prove to be technologically feasible. No one is yet in a position to deny that possibility. Yet even after it becomes a technical success, there is much to be done to make it a commercial success.

Let it be clearly stated at the outset that we believe in progress, and that we refuse to believe that the ultimate in containers or procedures has been achieved.

Next, what is Pliofilm? It is known to be a thin sheet of a transparent substance known chemically as rubber hydrochloride. What else it may contain, or what its composition or physical properties may be in the future, one can only surmise. Yet it is to be expected that Pliofilm will be constantly improved in days to come even as glass, tin, paper, glassine and Cellophane have been improved. To speak of the properties or limitations of any material today does not imply that similar properties will be incorporated in the years to come. Without question, added values will be incorporated if there is need for them.

It is known today that Pliofilm will transmit carbon dioxide, apparently by solution. What about minute traces of moisture or other gases? Will a wet product packed in Pliofilm retain its original moisture over a two- or three-year period? Will a delicately flavored, wet, food product pick up any foreign flavor after prolonged contact with this packaging material? Will the quality of a food packed *and sterilized* in the new material after prolonged storage be the equal of the same food packed, sterilized and held in other types of containers for the same time? None of the answers to the foregoing questions have been given out, and one must necessarily wait until the experimenters choose to release comparative tests.

Assuming that all of the foregoing questions receive a favorable answer—that the new material is as satisfactory for canning purposes as it is for other forms of packaging—then come up the problems inevitably entailed in a commercial operation. Statements, attributed to the pioneers, are to the effect that the "bag canning" operation can be carried out on standard canning equipment. This appears to be grossly unfair to the investigators, for up to now no one has ever been able to make a limp bag stand on end to go through a mechanized *can* filling operation designed for tin cans or glass jars, and certainly no one would ever attempt to heat-seal a bag on a can closing machine.

The experienced food technologist will foresee that a production line must be set up that will fill bags (not cans), will permit check weighing, brining or siruping, folding the tops, heat sealing and then sterilizing. But this is not all.

Bag filling and sealing operations involve much more manual labor than glass or tin operations, and are much slower than either. A bag filling and sealing line operating at 40 per minute is rather fast, whereas can lines now fill and close 120 to 240 containers per minute. Evidently the labor cost of "bag canning" must be somewhat higher, thus offsetting some of the economics of a lower container cost.

Problems of Heat Penetration

Further perplexities arise when one considers the problem of sterilizing in bags. First of all they cannot be handled roughly or they may break. Nor can they be piled tightly in a retort crate for the rate of heat penetration into the interior of a mass of bags will be so slow that spoilage may result. In fact, spoilage would be almost inevitable.

Presumably, the bags must be kept separated in containers or trays in the retort. And pressure cooling must be employed, lest the bags all burst open when the retort is cooled. Extremely accurate pressure control will be imperative during cooling. When it is possible to open the seams of tin cans or lift the tops from glass jars by improper handling of retorts, what would happen to a thin bag?

Now comes the problem of proper physical protection of the bag of sterilized contents. It must be reinforced to withstand the rough handling of commerce. This will require individual cartons, but these must be packed in a shipping container much heavier than is normal for canned

foods. This extra strength is imperative because cartons do not have the strength and rigidity of cans, bottles or jars. Normally, the contents of cases of these rigid containers carry the load when stacked in piles.

And finally comes the problem of consumer acceptance.

None of the foregoing manufacturing problems are insurmountable obstacles. All can be solved, at a cost.

Big problem is to ascertain whether the bag can perform its function as a container for hermetically sealed foods, sterilized by heat, as economically as the more familiar containers. Also, whether the consumer acceptance of the proposed new package will compel its adoption in spite of the hypothetical costs. It is well known that the consumer's willingness to pay the price usually determines the ultimate policy.

Definitions Are NOT "Standards of Identity"

CONFUSION has arisen in food law enforcement because many have not realized that a comple. standard of identity is not necessary for certain types of exemption from label declaration of the ingredients of manufactured foods. Oftentimes a definition will suffice.

The new food law refers to *two* methods of establishing a basis for exemption from naming of ingredients. The law refers to "application of definitions and standards of identity". There is an obvious and clear difference between a definition and a standard. Moreover, this is a very important distinction. A definition should describe a food so that there will be a clear understanding between officials, the public, and the industry as to what is being talked about. But a standard of identity includes more than a mere descriptive definition. It may even include limits of quality by which a fully qualified commodity is INcluded and a substandard commodity EXcluded. Normally a definition will not go so far as that.

Quite a number of kinds of foods have common and usual names which are adequately descriptive for the information of the public when they appear on labels. For that sort of commodities it would seem entirely satisfactory that definitions be formulated, and that the goods so described then be exempt from the declaration of ingredients. Such a simple procedure will undoubtedly not be adequate for many kinds of foods for which the public wants additional facts in order to be sure that substandard commodities are not sold without proper identification to consumers of wholesome but under-normal quality.

A bit of cooperation along these lines is going to be very important early in January. Without such cooperation, the public officials and great divisions of the food industry are going to be in an untenable relationship to the law. Public opinion can be expected to be very critical unless there is a sincere effort to utilize simple straightforward procedures regarding definitions as well as the necessary formal and more elaborate plan of hearings to establish standards of identity.

Both methods of procedure have their place. Neglect of either will be serious.

Informative—Not Elaborate—Labeling

THE PRINCIPAL ARGUMENT for elaborate food labels is that the customer must be informed of the character of the goods being purchased. It is very important, therefore, to find out what "informative labeling" really means for those it is intended to serve. Food manufacturers will find great interest in a study of this subject made jointly by the WPA and the Department of Agriculture. The fact that it happens to have dealt with blankets, sheets, bath towels, and other textile products does not in any way decrease the real value of that study for foods.

The study was carried out by asking large numbers of consumers and merchants to comment on proposed items suggested for inclusion on goods labels. The degree of desirability of each item was considered and some opportunity was given for reply that was critical as well as that which was in support of theories of elaborate labeling.

Perhaps the theme song of the replies could well be called "The purchaser is entitled to know." This idea was most vigorously pressed with respect to such things as wool blankets, but it ran all through the study and doubtless would be equally emphasized with respect to foods.

The purchasers and the merchants seem equally aware of the fact that too much on a label can be almost as bad as too little. Folks are readily confused by overlabeling, and they admit it. And the use of elaborate interpretative statements that may be important in an industrial contract or negotiation will become mere annoyance to the popular user if presented on retail packages.

All of us interested in the food labeling problem will hope that the Food and Drug Administration will give attention to this phase of the problem. We recall with amusement, as well as with grief, the proposal that some cans of peaches have at least 37 words modifying that important identifying item of label every time the word "peaches" is used on such cans. We doubt whether Secretary Wallace is going to reach any such absurd finding. But it is a serious matter when anybody proposes seriously such a hodgepodge of needless information with the restrictive plan for use that has been advocated. If anybody wants to break down the food and drug law, which FOOD INDUSTRIES surely does *not,* we think that that would be a very successful way to proceed.

Let us have labels that give necessary information prominently. Less essential facts should be presented incidentally and only where they will serve a useful purpose as on a label panel. But the word "informative" does not mean the same as elaborate or confusing, even though some Food and Drug zealots seem to think so.

Cooperation, Not Fighting

TWO important trade associations have been unfairly charged with the intention to wreck the food law. The publicity to that effect had no foundation in fact. These associations intend to cooperate with the Food and Drug Administration. When cooperation fails, they intend to exhaust in the courts their obvious remedies against any regulations that seem improper or unfair.

The Food and Drug Administration has been needlessly harassed by the appearance of unwarranted threats against the law itself. Cooperation will be given to it where cooperation is deserved. To the impartial onlooker, the effort to go forward on this cooperative basis appears to be less sincere in some official places than it is among the leaders of the industry itself. Which is most unfortunate.

It will be necessary that these matters be brought to a head and be settled, now that the new law regarding labeling is in full force. Again we reiterate—the Food and Drug Administration will get every bit of cooperation which it deserves from the industry. Those worried minor elements in the Administration perhaps had better look to their own attitude with respect to the law and its fair application. Unreasonableness even in minor posts does not breed cooperation. Let us hope that the Secretary of Agriculture and his principal assistants appreciate this and that they will act accordingly.

How To Use DEXTROSE in Canning

Factors that control the substitution of dextrose for part of the sucrose used in canned fruits and vegetables determined by experiment

By E. W. EICKELBERG
Research Director, Fairmont Canning Co., Fairmont, Minn.

Part I

▶ Extended controversies between manufacturers of sucrose and dextrose at the standards hearings in Washington aroused much interest in the use of dextrose as an ingredient in processed foods. Much scientific and technical information about dextrose was given at these hearings, but little in the way of practical results was brought out.

However, much work has been done on the practical application of dextrose in food manufacture. And in this article are set forth results of practical tests of the use of dextrose in canning. The conclusions reached, as to suitable quantities of dextrose to use with various canned foods, will be useful to producers of

Canned Foods
Milk Products
Preserves, Jams and Jellies

DEXTROSE, more commonly known as corn sugar, has only in the last decade been made commercially available to the canning industry. The use of dextrose in the past has been restricted because pure food law regulations required that food products sweetened with any other sugar than sucrose (cane or beet sugar) should have the fact stated on the label.

However, this restriction was removed on Dec. 26, 1930, by a ruling of the Secretary of Agriculture, which states in part, "The use of pure refined corn sugar as an ingredient in the packing, preparation or processing of any article of food in which sugar is a recognized element need not be disclosed upon the label of any such product."[1] More recently[6] the U. S. Department of Agriculture has announced that in formulating definitions and standards for foods it will recognize—where the evidence of record justifies—the optional use of sugar and dextrose without declaration of their presence on the label. The inclusion of dextrose as an ingredient of a processed food and featuring of this fact on the label provides some manufacturers with a sales argument and an advertising appeal which captures public preference.

Commercial dextrose as it is known today is a wholesome product of 99.5 per cent purity, an easily assimilated and energy producing carbohydrate in the normal body. Dextrose is the same sugar chemically that is found in varying amounts in nearly all fruits and vegetables.

Since dextrose has been available for industrial purposes few investigations have been published relative to its use in canning. Van Arsdale and Eddy (1933)[4] found that dextrose could successfully replace part of the sucrose in tomatoes, peas, beets, carrots, peaches, pears, marmalade, some jellies and other fruits, packed in glass jars. However, the amounts of dextrose used in canned vegetables were small.

Carl R. Fellers *et al* in 1937[2] reported on packing 24 canned fruits and vegetables on a semi-commercial scale in tin and glass containers. Tne percentage quantities of sucrose (cane or beet sugar) which could be replaced by dextrose ranged from none in the case of sweet corn to 100 per cent in tomatoes, and 25 to 50 per cent in a variety of fruits.

Probably, the difference in results obtained by the earlier investigators were due largely to the purity of the dextrose used. Some of the adverse results experimenters might have obtained several years ago would have been different if they had had the purer dextrose now available.

The simple replacement method of trying and tasting contributed little to our knowledge of why more dextrose can be used in some products and not in others. It is the purpose of this article to point out some of the factors controlling the quantities of dextrose which can be successfully used in commercial canning fruits and vegetables.

One important problem which has retarded the use of dextrose in canning is the color change (darkening or caramelization) of dextrose when used in such products as canned peas, corn and condensed milk.

Early experiments brought out the fact that there were several factors which might influence caramelization besides temperature and time. It was the purpose in the following study to minimize the number of variables or control them in such a way as to determine the importance of the following factors on the caramelization of dextrose solutions:

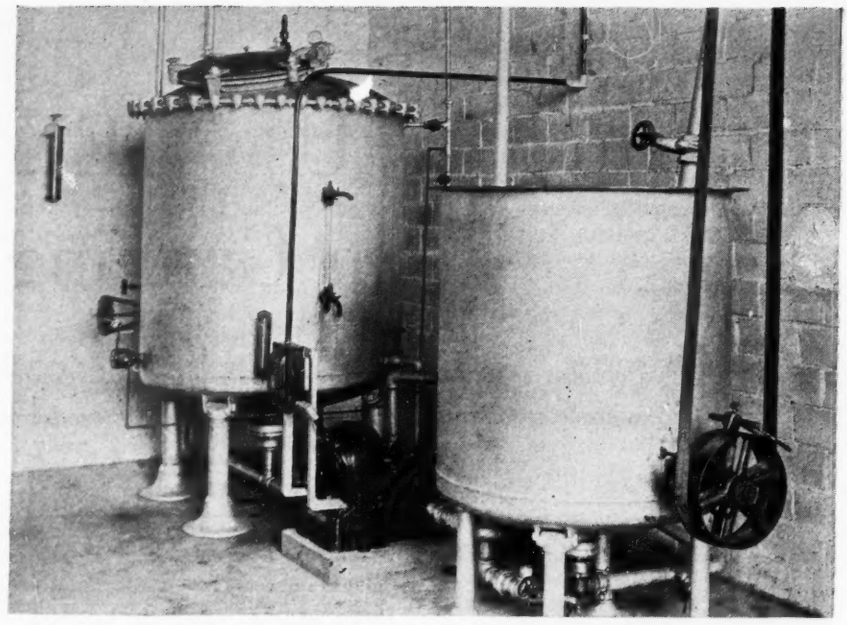
1. The effect of time and temperature;
2. The effect of metallic ions and inorganic salts;
3. The effects of amino acids and proteins;
4. The effect of starches and dextrines;
5. The effect of concentration of dextrose;
6. The effect of pH alone and on each of the above.

Heretofore, it was believed that the high temperature (240 deg. F.) and long process (35 to 60 minutes) were responsible for the darkening of dex-

trose in peas and brine packed corn. However, a 5 per cent distilled water solution of anhydrous dextrose in a pyrex glass beaker was heated two hours at 250 deg. F. with little or no evidence of discoloration. Therefore, it appears that time and temperature are not necessarily the causative agents, but may serve to increase the effect of the other factors present.

Since, in the modern food processing plant there is ample opportunity for food to come in contact with metal equipment, nine metal salts as chlorides were added to 5 per cent dextrose solutions and processed in Pyrex beakers for two hours at 250 deg. F. In these solutions, with a metallic ion concentration of 25 and 75 parts per million, there was no noticeable discoloration of the dextrose solution by any of the salts tried. Sodium, calcium, nickel, copper, zinc, aluminum, chromium, iron and tin chloride salts alone do not appear to influence the caramelization of dextrose under the conditions of this experiment. A concentration of 25 or 75 parts per million of these metallic salts could give serious discoloration in certain products even though dextrose was not present. The above evidence shows that a discoloration in a product may not necessarily be due to dextrose.

There is considerable evidence in the literature[1, 3] supporting the reaction between amino acids and dextrose with the development of highly colored compounds of progressive complexity. Ambler[3] found that, in the reaction between certain amino acids and dextrose at the boiling point in dilute solutions, the dextrose and amino acids were destroyed in the ratio of 10 to 1. The greatest effect is obtained in the reaction between dextrose and a protein hydrolyzate when the reaction is either neutral or slightly acid. The preparation and study of the reaction of each of the amino acids with dextrose would require considerable time. This information would not be of much value unless the amino acid content and the protein breakdown were known regarding particular fruits or vegetables which you desired to pack with dextrose. In this case an experimental trial under controlled conditions would be more revealing.



Brine mixing tanks at Fairmont Canning Co. plant, where sugar and salt are dissolved in water for filling into cans at the filling machines.

Experiments in processing dextrose solutions with starches and dextrines of various reducing values indicated that starches or dextrines did not have a significant influence on the caramelization of dextrose.

For studying the effect of the concentration of dextrose on caramelization, dextrose solutions of various concentrations were prepared and sealed in plain or C-enameled cans and glass jars. The acidity (pH) was measured before and after heating two hours at 250 deg. F. (This severe process was used to accentuate differences which would more readily lend themselves to measurement, and because a 10 per cent sugar solution in glass did not show appreciable caramelization unless given the above process.) Commercial canning processes are usually less than this, with the rate of heat penetration one determining factor of the length of process.

The color of the solutions was measured before and after processing by reference to color standards prepared from Berghausen free flowing caramel, 1 cc. of caramel being diluted to 100,000 cc. with distilled water. A color of 4 units or 4 parts of caramel color per 100,000 would appear objectionable in most canned foods.

From Table I it is evident that:

1. Under a given set of conditions greater caramelization is noticeable in the more concentrated dextrose solutions.

2. In general, the pH of dextrose solutions decreases with the concentration upon heating.

3. Glass has the least, tin cans the next, and C-enameled cans the greatest effect on the caramelization of dextrose solutions. The acid condition affected the C-enameled cans, which are not particularly acid-resistant and are generally used with nearly neutral products such as peas and corn.

Since previous experiments indicated that the acidity might be a very important factor, such fruit and inorganic acids as lactic, acetic, oxalic, citric, maleic, phosphoric, nitric, sulphuric and hydrochloric were added to 25 per cent dextrose solutions in glass beakers in sufficient quantities to adjust the pH at three levels, 5, 4,

TABLE I—Effect of Concentration of Dextrose on Caramelization in Various Containers

Per cent Dextrose Concentration	pH	pH after Heating			Original Color After Heating			
	Original	Glass	Tin	Enamel	Color	Glass	Tin	Enamel
5	6.38	4.12	4.45	5.10	0.0	1.0	2.2	3.4*
10	6.35	4.03	4.18	5.05	0.4	1.7	2.8	4.4
15	6.29	3.94	4.10	5.00	0.8	2.4	3.5	5.7
20	6.18	3.89	3.95	4.90	1.1	3.4	4.0	6.2
25	6.04	3.85	3.89	4.80	1.3	4.5	4.3	7.3
30	5.88	3.83	3.81	4.65	1.6	5.2	4.6	8.1
35	5.72	3.79	3.71	4.50	1.9	6.3	4.9	8.6
40	5.50	3.76	3.61	4.41	2.2	6.9	5.3	9.0
45	5.30	3.73	3.50	4.30	2.5	7.6	5.6	9.5
50	5.00	3.70	3.40	4.20	3.0	8.3	6.5	10.0

* Color values greater than four are objectionable

and 3.4. Color comparisons were made before and after processing two hours at 250 deg. F. It was found that the discoloration was inhibited in the lower pH solutions. Also, the kind of acid did not seem to be of significant difference except with phosphoric acid.

To observe the effect of pH on the caramelization of dextrose various quantities of lactic acid or sodium hydroxide were added to anyhdrous Dyno (recrystallized dextrose), regular dextrose hydrate and sucrose sugars. The pH and color before and after processing are tabulated in Table II.

From the data in Table II it is evident:

1. That alkaline and nearly neutral solutions favor caramelization of dextrose.

2. That as the pH decreases to 2.50 the amount of discoloration in dextrose solutions decreases.

3. That the caramelization of sucrose is less in the alkaline solution but increases as the pH decreases.

4. From this experiment, anhydrous dextrose appears equally as good as the recrystalized product, as to color, for canning purposes.

Let us recapitulate:

1. The time and temperature of processing are not necessarily the causative agents of darkening of dextrose solutions but may serve to increase the effect of other factors present.

2. The metallic content unless excessive appears to have little effect upon discoloration of dextrose solutions.

TABLE II—The Influence of pH upon Color of Various Processed Sugar Solutions

Test solutions heated for 2 hours at 250 deg. F., in "Pyrex" glassware, using distilled water and commercial dextrose and sucrose.

Code	Before Heating pH	Before Heating Color	After Heating pH	After Heating Color
Anhydrous Dextrose				
A0 Control	5.48	1.3	3.80	6.0
A1	7.65	1.3	3.91	9.5
A2	6.30	1.3	3.89	8.0
A3	4.56	1.3	3.75	6.0
A4	3.80	1.3	3.61	4.0
A5	3.20	1.3	3.18	3.0
A6	2.50	1.3	2.49	3.0
Dyno Recrystallized Dextrose Hydrate				
D0 Control	5.30	1.0	3.8	5.0
D1	7.22	1.0	3.91	8.5
D2	6.55	1.0	3.89	8.0
D3	4.70	1.0	3.76	5.0
D4	3.81	1.0	3.61	4.0
D5	3.29	1.0	3.28	3.5
D6	2.55	1.0	2.50	3.0
Regular Dextrose Hydrate				
R0 Control	5.71	3.5	3.83	8.0
R1	7.45	3.5	3.90	13.0
R2	6.50	3.5	3.89	10.0
R3	4.76	3.5	3.73	8.5
R4	3.95	3.5	3.68	7.0
R5	3.30	3.5	3.31	5.0
R6	2.53	3.5	2.65	3.5
Sucrose				
S0 Control	5.49	1.0	3.68	5.5
S1	7.45	1.0	3.97	4.5
S2	6.30	1.0	3.69	5.5
S3	4.50	1.0	3.59	7.2
S4	3.90	1.0	3.49	7.5
S5	3.30	1.0	3.20	3.5
S6	2.58	1.0	2.53	21.0

3. The influence of amino acids and proteins upon dextrose should be studied for each particular product.

4. The higher the concentration of dextrose the greater the possibility of discoloration upon processing.

5. The acidity as measured by pH has a most important influence in affecting the caramelization upon processing. As the pH decreases from neutrality (7.0) to 2.50 the caramelization is inhibited and discoloration is decreased.

Let us consider the canning of certain products in the light of these findings. Cream style corn, with its nearly neutral reaction, long process (70 minutes at 250 deg. F. for No. 2 tin) and nature of protein material, does not permit the use of any significant quantities of dextrose in its manufacture.

Similar conditions prevail for brine pack whole kernel corn with a somewhat shorter process (50 minutes at 240 deg. F. for No. 2 tins). It is possible to pack whole kernel corn with 10 to 25 per cent replacement of sugar by dextrose, with short processes at higher temperatures.

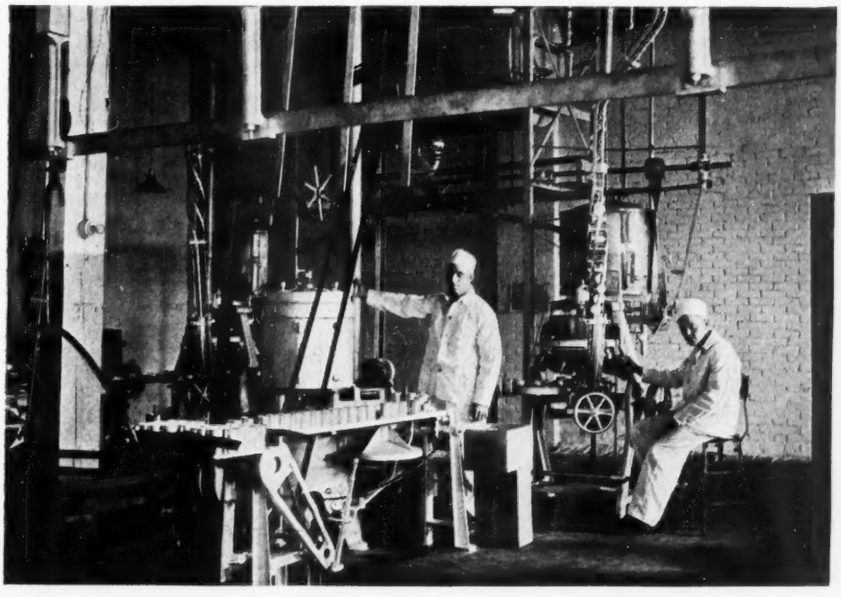
Peas permit the utilization of greater quantities of dextrose because they have a slightly lower pH than corn, different protein composition and shorter process (35 minutes at 240 deg. F.). If a longer or shorter process is used the possible quantities of dextrose vary accordingly.

In the case of baked beans a certain amount of caramelization is desirable to give the characteristic color and flavor.

On the other hand, tomatoes with a low pH, about 4.2, and only requiring a short process can use up to 100 per cent dextrose as the sugar added if a packer desires to add sugar to his product.

In the canning of fruits we have a more acid condition and a more favorable pH for dextrose. Although a higher concentration of sugar is used in canning fruits, this is offset by the fact that the process is usually short and at the temperature of boiling water. In general, there is little difference if any between all sucrose and dextrose-sucrose packs as far as texture, color, attractiveness and usually viscosity are concerned. The discernible difference between fruits packed with sucrose or sucrose-dextrose sugar is to be found in the flavor and palatability.

Part II of this article will be published in a forthcoming issue of FOOD INDUSTRIES *and will set forth the conclusion drawn by Dr. Eickelberg from the tests outlined in this installment.*



Filling and closing machines for cream style corn at plant of Fairmont Canning Co.

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Three Methods for Determining

"FOREIGN" MATTER in Flour

Chemical and physical tests for contamination by confused flour beetle (Tribolium confusum) reveal presence of eggs and excreta

By
BERNARD L. BLUMBERG
and
CHARLES W. BALLARD
College of Pharmacy, Columbia Universiy, New York

INSECT depredations on stored grain and milled products in the United States are estimated to cause a loss of approximately $250,000,000 annually, besides the incalculable losses of consumer good will and reputation of milling companies, flour brokers and bakers.[1]

Flour millers throughout the United States are well aware of the susceptibility of flour to insect attack. To control the damages of insect pests they resort to sanitary measures, fumigation, screening, etc. Notwithstanding the efficiency of such methods, infestation usually is merely minimized —not obviated. This idea is factually substantiated by such investigators as Dean *et al*[1], who state: ". . . . during blending operations the larvae are sometimes bolted out by the thousands. The senior author recalls one instance where two 140 lb. bags of a straight-grade flour were found to contain 1,460 and 1,000 worms, respectively, just previous to shipping." The same experimenters noted infestation in approximately 1,900 of 2,367 8-oz. samples of stock taken from elevator boots or purifier conveyors during 1934-35. These samples revealed 74,175 insects, representing 30 different species, although *tribolium* species comprised 84.65 per cent of the total number.

In view of the strong possibility of insect contamination, regulatory analysts are frequently called upon to inspect flour samples for insect ravages. In such an examination, the presence of adult beetles, pupae, larvae, eggs or excreta is equally significant. Thus, in the absence of either adult or immature insect forms, the eggs or excreta may indicate that insects were originally present in the sample.

What, then, are the advantages of methods for detecting eggs and excreta? First, a more rigid control on the quality of milled flours; second, increased consumer good will and diminished possibilities of conflict with regulatory authorities. At this point one should remember that insect eggs require but a few days to hatch into more mature forms which move about and are readily seen, while excreta represent filth even in the absence of all insect life.

It would seem, therefore, that methods for detecting eggs and/or excreta should be of extreme interest to the miller as an assurance that his product is free from contamination and to the manufacturer or dealer who may have to store flour before utilizing or selling it. Furthermore, the procedures furnish a check on the efficiency of rebolting processes.

Egg Detection Methods

For the convenience of those who may have occasion to utilize the methods proposed in this paper, the procedures are briefly outlined as follows:

(1) ACID DIGESTION METHOD:

(*a*) Securely arrange 6XX bolting cloth on a form. Avoid overlapping or wrinkling of the bolting surface.

(*b*) Remove 60 to 90 grams of sample, preferably by corings, to a watch-glass, weigh, and transfer to the bolting cloth.

(*c*) Sift sample gently, until no more flour passes through the cloth, then transfer the "overs" to a 250 cc. beaker.

(*d*) Add 1 to 3 cc. of 95 per cent alcohol, wet the overs by rotating beaker, then add 30 cc. of 5 per cent sulphuric acid. Cover beaker with watch-glass.

(*e*) Heat on boiling water-bath for 10 minutes, remove, and pour entire contents of beaker through a 9 cm. Buchner funnel containing a double thickness of paper. Keep beaker partially inverted over funnel, and wash inside thoroughly with distilled water.

(*f*) After washings are completed, add 30 cc. of 1 per cent aqueous iodine, or a sufficient amount to cover the paper for at least 15-30 seconds. After the iodine has passed through filter, wash paper with about 30 cc. of 1 per cent sulphuric acid followed, if necessary, by water washings. The paper will assume a medium to pale blue color.

(*g*) Remove wet paper from funnel by grasping edge with forceps, and place on flat glass plate.

(*h*) Examine with simple lens (3x) for eggs (yellow-brown, ovoidal, glistening, illustrated in Fig. 1). Any brown particles which may be insect fragments are further studied under higher magnification.

(2) FLOTATION METHOD:

(*a*) Add 100 cc. of a mixture consisting of three parts toluol plus five parts chloroform to the separatory apparatus illustrated.

(*b*) Weigh 30 to 50 grams of sample on watch-glass, and transfer to apparatus. Wash sides of funnel with 25 to 30 cc. of tuluol-chloroform.

(*c*) Insert ground glass stopper, gently invert funnel about 30 times to thoroughly wet and suspend the sample, then place funnel in rack, and remove stopper.

(*d*) Add 85-90 cc. of toluol-chloroform, running first few cc's over stopper.

(*e*) Cover top of apparatus with glass plate and let stand 10 minutes.

(*f*) Reinsert stopper and decant contents of open funnel through a Buchner funnel containing paper which has previously been wetted with 95 per cent alcohol. With stopper still in place, rinse top of funnel with two or three 10 cc. portions of toluol-chloroform. Filter, wash sides of funnel and paper with a small quantity

of 95 per cent alcohol, and then water.

(*g*) Stain and complete procedure as described in "*f, g, h*" of "Acid Digestion Method."

The detection of *tribolium* eggs by digestion and staining is practicable in fine flours, such as patents and clears, if the sample is subjected to a preliminary bolting. This accumulates the eggs in the overs fraction and reduces the bulk of material. In routine analytical tests a 6XX silk cloth seems suitable for preventing passage of the eggs and separating them from a large quantity of flour. While the authors have not worked with any finer cloths, they believe that very finely ground flours could be bolted through a 10XX without producing too much overs to be handled by digestion. If this supposition is correct, not only *tribolium* eggs but also the smaller eggs of other flour infesters could probably be detected.

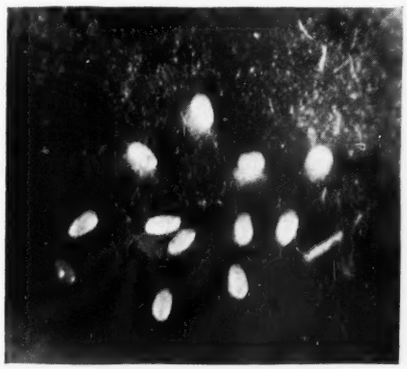
For the examination of the filter paper after digestion and staining, it is advisable to use a simple lens (3x) followed, if necessary, by a low-power (40x) binocular, and a compound microscope with a lens combination magnifying 100x. The simple lens permits rapid recognition of the eggs for counting and their differentiation from small fragments of brownish seed coat tissue or similar plant tissue. The binocular microscope not only accentuates the globular form of the eggs, but also affords an excellent contrast between these structures and the more or less flat plant tissue fragments. Any structure of questionable identity may be confirmed under 100x magnification.

The filter paper, prior to being placed in the funnel, may be marked into quadrants with a pencil. The marks are still visible after staining, especially if the residue is slight, and inspection of the filter paper is thus facilitated.

The paper, upon removal from the funnel, should be examined within 10 minutes, because the eggs begin to collapse and shrink as the paper dries. If the paper is kept wet ,the eggs may retain their characteristic appearance for an hour or more.

To prevent collapse of the eggs, the diminished pressure for the Buchner filtration should be attained very gradually and extremes are to be avoided.

Both the flotation and digestion methods of preparing material for the iodine staining procedure have been suggested. Each has advantages and disadvantages. The subsequent comparison should guide the analyst in his choice of methods:



Tribolium ***eggs on filter paper after acid digestion method and iodine stain. Note luster and variation in staining intensity and shape. Photographed by reflected light. Magnified approximately 10x.***

Flotation Methods

(1) Method employs 30 to 50 grams of sample.

(2) Not necessary to bolt the sample, thus loss of eggs other than *tribolium* is avoided by this method.

(3) While it has not been definitely proved in this investigation that all eggs rise in the chloroform-toluol mixture, present indications point to this conclusion.

(4) The filter paper usually retains a deep blue stain and is not readily decolorized; this may be especially undesirable, if insect fragments are present.

(5) Eggs may adhere to the sides of the funnel during washing.

(6) Method involves use of special equipment.

(7) Excreta sink to bottom of apparatus and are not present on the filter paper.

(8) Method can be applied to hard and soft wheat patent, clear, first middling and fourth break flours.

Digestion Method

(1) Method employs 60 to 90 grams of sample.

(2) Sample is bolted with possible loss of small particles and small eggs.

(3) All uninjured *tribolium* eggs should be retained by a 6XX silk bolting cloth.

(4) The filter paper may stain dark, but it is readily decolorized in most cases.

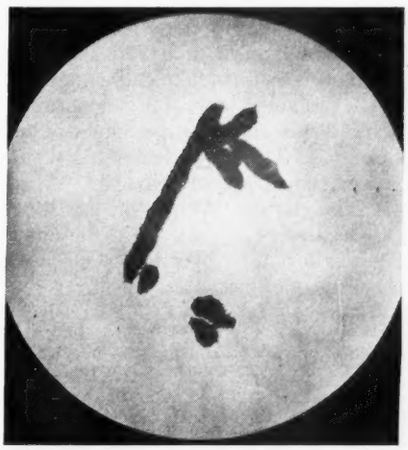
(5) Eggs are easily and quickly washed out of the beaker.

(6) Method involves use of ordinary laboratory equipment.

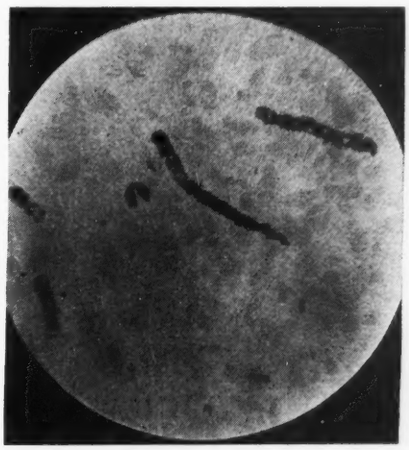
(7) Larger excreta which are held back by 6XX cloth may resist acid digestion and will be present on the filter paper.

(8) Method more or less restricted to hard and soft wheat clear and patent flours.

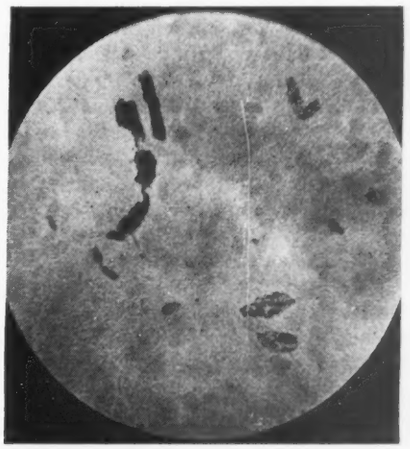
The acid digestion procedure is more satisfactory for those flours to which it is applicable.



Opaque excreta in clove oil mount. Note almost solid black appearance of particles. Magnified approximately 100x.



Cast-like excreta in clove oil mount of infested flour. Note light and dark areas in casts. Magnified approximately 100x.



Opaque excreta and spotted casts in flour. Clove oil mount. Magnified approximately 100x.

Clove Oil Excreta Methods

(A) SLIDE EXAMINATION:-

(*a*) Weigh 0.1 gram sample on a glass plate. Divide into approximately five equal portions.

(*b*) Add 4 to 5 drops of clove oil to each portion, and mix thoroughly. Use a dissecting needle, the lower end of which has been bent at a 60 degree angle, for mixing.

(*c*) Let mount stand about 10 minutes, then examine under a low-power binocular by reflected light (Howard's method[2]), and also under a 60 to 100x magnification by transmitted light. Characteristics of *tribolium* excreta are illustrated in the photographs.

(B) WATCH-GLASS EXAMINATION ON UNBOLTED SAMPLE:-

(*a*) Mix 1.0 grams of sample with 2 cc. of clove oil in a 6 cm. deeply concave watch glass. Let stand 30 minutes.

(*b*) Examine by reflected and transmitted light. Flour sinks to bottom and excreta usually float above, although both remain below the surface of the liquid.

(C) WATCH-GLASS EXAMINATION ON BOLTED SAMPLE:-

(*a*) Bolt sample (60 to 100 grams) through a 6XX or even finer silk cloth. Overs, in quantities up to 0.1 gram, may be handled as described in "A", and, in quantities up to approximately 1.0 gram, as described in "B".

Several photographs depict the shape and structure of the excreta. By way of further explanation, it may be pointed out that the cast-like excreta in a clove oil mount (100x) are characterized, more or less, by a tubular shape, the wall being alternately bulged or expanded and constricted. At rather regular intervals there are deeply pigmented deposits giving the object either a striped or spotted appearance. The rest of the tube is colorless and apparently noncellular. The ends are frequently truncate, sometimes tapering.

The opaque excreta in clove oil mount (100x) are rather uniformly colored, from light brown to brown-black. Here again, one find a colorless, practically transparent, noncellular groundwork on which pigmented deposits rest, but the pigmentation seems more extensively distributed throughout the structure. The wall may or may not exhibit a definitely convoluted appearance. Not infrequently one finds starch grains constituting a part of the excretory fragment. Either one or both ends usually taper to a point, resulting in a fusiform appearance.

Sizes of *Tribolium* Eggs, Larvae and Excreta in Comparison with Bolting Cloth Apertures

	Scott, p. 400		A. Hurst and Co.			
Cloth	Length	Number aperature in mm.	Meshes per Lineal inch	Insect material	Minimum length mm.	Minimum width mm.
5XX	0.265	66.0	66	Larvae (After Good)	0.863	0.193
6XX	0.230	73.6	74			
7XX	0.195	81.3	82	Larval excreta	0.066	0.058
8XX	0.180	87.4	86			
9XX	0.150	97.8	97	Larval casts	0.083	0.025
10XX	0.125	110.2	109			
11XX	0.115	117.8	116	Adult excreta	0.116	0.058
12XX	0.105	127.0	125			
13XX	0.095	133.6	129	Egg (After Good)	0.576	0.257
14XX	0.085	141.0	139			
15XX	0.075	149.3	150			
16XX	0.070	153.9	157			

Intermediate forms are occasionally encountered, and are difficult to classify, but since the presence of any of these structures has the same significance, this point is of little concern.

Tribolium excreta may be detected by Howard's method, or by the procedure outlined in this paper. In general, it is suggested that both methods be employed, and that the mount be examined by reflected and transmitted light. Clove oil, as the mounting medium, renders the flour more transparent than any other liquid investigated.

The accompanying tabulation represents original data combined with certain information from Good[3], Scott[4] and A. Hurst and Co.[5] It shows the minimum length and width of the *tribolium* eggs, larvae, larval casts and excreta, and adult excreta. It might be inferred that 6XX cloth would prevent passage of the eggs and that 8XX would remove larvae. But not even a 16XX is sufficiently fine to retain the very small larval or adult fecal particles, if they are presented endwise to the cloth aperture. On the other hand, some excreta may be held back by 6XX cloth.

Special separatory funnel for flotation method.

The flours which served as controls for the microscopic work were apparently free of eggs and insect fragments, and yet they consistently showed structures which resembled certain cast fragments. These cast-like structures show blackish deposits possibly due to optical effects. The deposits appear in recticulate patterns and the masses are not bounded by any definitely outlined tubular frame. Under a 400-600x magnification, the reticulum will be seen associated with a cluster of cellular inclusions (starch grains). It will be recalled that the almost transparent background of a cast appears noncellular.

There are other fragments present, but unaccounted for, in the control flours, *viz.*, very small, dark brown to black, irregularly circular to rectangular forms. They seldom exceed 0.05 mm. through the longest axis and frequently possess rather sharp edges and corners. At present, it is thought that these fragments are foreign to wheat flour and may be of insect origin, but the extent of these experiments does not permit any positive conclusion.

Although but few samples purchased in the open market were examined, it is interesting to note that one of these showed clear indications of infestation notwithstanding the acceptance statement of the American Medical Association appearing on the package. This particular sample showed two excreta particles in a 0.1 gram portion. While the egg test was negative, examination of the filter paper after the digestion procedure revealed one insect fragment.

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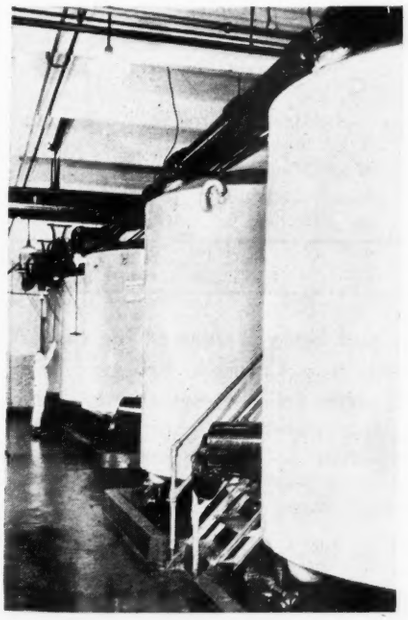
Fresh Flavor Assured *By Prompt Freezing*

Ice cream quality improved by speeding up steps in manufacture

By
R. E. HEYL
and
P. H. TRACY
Department of Dairy Husbandry
University of Illinois, Urbana, Ill.

PEOPLE eat ice cream primarily because they like it. There are, of course, other reasons why ice cream is a popular food—its nutritional value, refreshing qualities and its convenience as a dessert—but the chief reason is its flavor. Since flavor is such an important factor in ice cream consumption it seems that the ice cream industry should concentrate its efforts toward making a tastier product. The proper selection of flavoring materials is important in this respect as well as the proper methods of processing the mix and freezing and hardening the ice cream. However, one of the most important factors in making quality ice cream, and one that is frequently overlooked, is the freshness of the product.

The popularity of ice cream is increasing constantly, due primarily to the fact that fresh milk products of high quality are being used, and to the fact that ice cream, as a perishable product, is being placed in the hands of the consumer in a much shorter time than has been possible in the past.



If the practice recommended by the authors of this article becomes generally adopted, fewer storage tanks for ice cream mix, such as shown in this picture, will be needed.

Planned Experiment Shows Possible Speed

As far as is known, no attempt has ever been made to demonstrate just how fresh ice cream can be when made on a commercial basis. An experiment was planned to reduce to a minimum the time interval between the production of the milk and the consumption of the ice cream, and to compare the ice cream made from fresh ice cream mix with that of ice cream made from aged ice cream mix.

The milk for the experiment was received at the University Creamery immediately after the morning milking period at the University barns. Part of this milk was clarified and pasteurized as a basis for the ice cream mix. Gelatin, sugar, and powdered egg yolk were added to the milk before pasteurization. The remainder of the milk was separated as a heavy cream to supply the necessary additional fat to the mix.

Immediately after the mix (less the cream) was pasteurized, it was drawn into a vacuum pan and the condensing operation was started. In the meantime, the cream necessary for establishing the desired ratio of fat to milk-solids-not-fat in the mix had been standardized, pasteurized, and was later drawn into the vacuum pan.

FRESHNESS OF FLAVOR is one of the most important factors making for high quality in manufactured foods. Too often, in establishing standards of quality, this matter of fresh flavor is overlooked, or minimized. However, flavor freshness still remains one of the surest means for attracting and holding the consumer.

In this article, dealing with the way to obtain fresh flavor in ice cream, the authors stress the importance of speedy handling of raw material from its origin up to the completion of the process. The steps taken to speed up the processing of ice cream will suggest ways of cutting down elapsed time in the manufacture of ALL FOODS

As soon as the mix was concentrated sufficiently, it was removed from the pan, restandardized, homogenized, cooled, flavoring added, and frozen in a continuous freezer. Ice cream was thus obtained in approximately 4¼ hours after the milking period.

The ice cream was hardened rapidly at –20 deg. F., and served for lunch approximately 6½ hours after the milking period, thereby establishing what the authors believe to be an all time commercial record for the time interval between the milking period and the serving of the ice cream.

Table I shows the quantities of ingredients used in making the ice cream mix and the percentage composition of the ice cream. Table II shows the sequence and time of oper-

ation during the manufacture of the ice cream.

The milk was received at 7 a.m., condensed by 9:15 a.m., homogenization started at 10:02 a.m., and at 10:16 a.m. the ice cream was discharged from a continuous freezer at 100 per cent overrun. After a hardening period of approximately two hours the ice cream was served at a family luncheon. While it is realized that such a procedure is not practical from a commercial standpoint because of the limitations of equipment and immediate supply of milk, it does demonstrate the possibility of providing the consumer with a high quality ice cream by keeping in mind the importance of freshness as a desirable prerequisite.

TABLE III—A Comparison of Freezing Data Observed on a Continuous Freezer when Ice Cream Mix was Frozen Immediately After Processing, After a 4 Hour Aging Period and Again After a 24 Hour Aging Period.

	No Aging	4 Hours Aging	24 Hours Aging
Time ice cream made	10:16 a.m.	2:15 p.m.	10:15 p.m.
Temperature of mix	44 deg. F.	44 deg. F.	32 deg. F.
Back pressure, lb. per sq.in.	11		
Air pressure, lb. per sq.in.	15		
Amperes	11		
Overrun of ice cream when drawn	100 per cent	100 per cent	100 per cent
Temperature of ice cream	21.5 deg. F.	21.7 deg. F.	21.7 deg. F.

TABLE IV—A Comparison of Overrun and Freezing Temperatures of Ice Cream Frozen in a Counter Freezer Immediately After Processing, After a 4 Hour Aging Period. and After a 24 Hour Aging Period.

	No. Aging		4 Hours Aging		24 Hours Aging	
Time	10:50 a.m.		2:55 p.m.		11:05 p.m.	
Temperature of Mix	51 deg.F.		53.4 deg.F.		52.5 deg.F.	
End of Minute	Per Cent Overrun	Temp. deg.F.	Per Cent Overrun	Temp. deg.F.	Per Cent Overrun	Temp. deg.F.
1	12	35	20	43.1	17	45.5
2	25	31	25	34.8	20	35.5
3	28	27	28	27.5	22	27.5
4	37	26.5	38	26.4	34	27.2
5	48	25.6	51	25.3	48	26.5
6	61	24.4	64	24.4	59	24.6
7	82	23.6	85	23.6	76	24.0
8	100	24.1	104	24.0	92	24.2
9	104		106		111	
10	110		112		116	
11	110		120		125	
12	115		126		136	
13	117		136		135	
14	120		144		135	
15	118		148		140	

Comparison of Fresh and Aged Mixes

In order to extend the experiment over various phases of ice cream manufacture, some of the mix was frozen in a counter freezer, as well as in a continuous freezer, while fresh, and after 4 and 24 hours of aging.

TABLE I—Quantity of Ingredients in the Mix and Percentage Composition of the Ice Cream

Ingredient	Weight in lb.	Percentage Composition of the Ice Cream
		Per Cent
4% Milk	695.0	12 Fat
40% Cream	111.0	11 Serum Solids
Sugar	90.0	15 Sugar
Gelatin	2.1	.35 Gelatin
Egg Yolk	2.4	.40 Egg Yolk
Total amount of mix	615.0	38.75 Total Solids
Pure Bourbon bean vanilla extract	.....	4 oz. to 5 gal. of mix

Tables III and IV show the freezing data for the continuous and counter freezers respectively. In general there was little difference in the whipping quality of the mixes except in the maximum overrun obtainable when the counter freezer was used. The fresh mix whipped in much the same way as the aged mixes except that a higher maximum overrun was obtained in the case of the aged mixes.

There was a decided difference in the body of the ice cream as is shown by the data in Table V. Ice cream made from the mix aged 4 and 24 hours had a better body and texture, particularly in the case of the counter freezer product. Aging had no effect upon the flavor of the ice cream, as is shown by the flavor scores in Table V. When the ice cream was judged a week later, the ice cream which was frozen immediately after processing was found to retain more of its original fine flavor than the ice cream frozen from aged mixes.

TABLE II—Sequence and Time of Operation in Processing and Freezing Ice Cream Mix by a Continuous Method

Operation	Time
Completion of milking	6:00 a.m.
Reception of milk from University barns	7:00 a.m.
Clarification	7:00–7:36 a.m.
Beginning of forewarming — temperature 85 deg. F	7:36 a.m.
Gelatin, sugar, egg yolk added to milk	7:45 a.m.
Pasteurization (160 deg. F. for 20 minutes)	7:52–8:12 a.m.
Mix drawn into vacuum pan	8:15 a.m.
Separation, standardization, and pasteurization of cream from original milk	7:44–8:46 a.m.
Cream drawn into vacuum pan	8:55 a.m.
Mix condensed to 10.5 deg. Baumé	9:15 a.m.
Mix removed from pan	9:18 a.m.
Standardization of mix	9:20–9:53 a.m.
Homogenization	10:02 a.m.
Continuous freezing began	10:08 a.m.
First ice cream of 100 per cent overrun received	10:16 a.m.
Hardening of ice cream	10:20–12:00 a.m.
Delivery to customer	12:15 p.m.
Probable consumption	12:30 p.m

TABLE V—A Comparison of Flavor and Body Scores of Ice Cream Frozen in a Continuous Freezer and in a Counter Freezer, Two Days After, and One Week After the Processing of the Mix

	Two days after processing		One week after processing	
	Body score	Flavor score	Body score	Flavor score
No aging				
Continuous freezer	24.00	45.50	23.50	45.00
Counter freezer	22.85	45.50	22.00	45.00
4 hour aging				
Continuous freezer	24.25	45.50	24.00	44.00
Counter freezer	23.25	45.50	22.50	44.00
24 hour aging				
Continuous freezer	24.50	45.50	24.25	44.00
Counter freezer	23.75	45.50	22.65	45.00

Aluminum Labels and Foils Weaken Bottle Washing Solutions

By
C. A. SHILLINGLAW
A.B.C.B. Research Fellow
and
MAX LEVINE
Professor in Charge
A.B.C.B. Research Fellowship
Iowa State College, Ames, Iowa

USE of aluminum labels and foils on beverage bottles has increased greatly. Because of rapid reaction between caustic soda and the aluminum metal contained in these labels and foils, special consideration must be given to the effect of aluminum on the soaker solutions used for washing such bottles.

When a solution of caustic soda, or sodium hydroxide, comes in contact with aluminum, the metal dissolves, hydrogen gas is liberated and the caustic soda and aluminum form a new, milder alkali, known as sodium aluminate.

That this destruction of caustic soda and replacement by the milder sodium aluminate may reach important proportions can be seen from the results in Table I, obtained by chemical analysis of solutions taken from a soaker in which bottles having both aluminum labels and foils had been washed.

The fact that there is 1.2 per cent sodium aluminate present in the solution of the second compartment means that, while the total alkali concentration of the bottle washing solution would remain the same, the caustic concentration would be lowered 1.2 per cent by the washing of 10,000 cases of bottles. We know from past researches carried on in the A.B.C.B. Fellowship laboratories that caustic soda must primarily be depended upon to effect sterilization of a bottle, and that the milder alkalies, trisodium phosphate, sodium carbonate, etc., are much less effective as sterilizing agents.

Since nothing was known about the germicidal efficiency of sodium aluminate, tests were run to see if the formation in a soaker solution of sodium aluminate, with a corresponding decrease in amount of caustic soda, would appreciably affect the germicidal power of a given solution.

The method which has been adopted and found serviceable for comparing the germicidal strength of various alkalies, or alkali mixtures, is to compare the times required for equally strong solutions of these alkalies or mixtures to kill 99.9 per cent of a quantity of spores of *Bacillus metiens*, suspended in the alkali solution and held at a definite temperature.

In order to determine the effect on germicidal properties of transforming caustic soda into sodium aluminate, sufficient aluminum was dissolved in a 2 per cent caustic solution to make the composition 1.25 per cent caustic and 0.75 per cent sodium aluminate, and the time required for this 2 per cent alkali to kill 99.9 per cent of the *Bacillus metiens* spores, at 112 deg. F. compared with the time required by the original 2 per cent caustic solution. Note that the total alkalinity, and by present titration methods the total apparent causticity, of the two solutions was the same.

It was found that while it took 43 minutes for the original 2 per cent caustic solution to kill 99.9 per cent of the aforementioned spores, it required 80 minutes for the solution in which 0.75 per cent caustic had been transformed into sodium aluminate.

It might also be well to point out for the benefit of those few plants who determine the caustic content of their bottle washing solutions by means of a phenolphthalein-methyl orange titration, that this method is particularly inaccurate in the presence of aluminum, and tends to underestimate the amount of caustic present rather than to overestimate it as does the A.B.C.B. caustic test.

These facts made it seem necessary to develop a modification of the caustic test which would correctly evaluate the causticity of a solution in the presence of unlimited amounts of sodium aluminate. Such a test has been developed and differs from the regular A.B.C.B. caustic test only in that it uses a different preliminary (number 1) tablet. With this preliminary tablet a different indicator is used which causes the color change to be from green to blue instead of from orange to lemon yellow, as in the regular A.B.C.B. caustic test.

While with the regular A.B.C.B. caustic test all but $\frac{1}{4}$ per cent of the sodium aluminate shows up as caustic, so that the apparent caustic concentration might be several per cent too high, the modified caustic test shows the actual amount of caustic present to within $\frac{1}{8}$ per cent.

Comparisons of the results given by the two caustic tests on various alkali bottle washing mixtures were also made and are shown in Table II.

The fact that the differences in the results obtained by using the two different caustic tests on alkalies which contained no aluminate are so slight (about $\frac{1}{8}$ per cent) shows that the modified caustic test may be used satisfactorily for determinations of causticity under any conditions known today. However, the use of this modified caustic test is not recommended except in cases where appreciable numbers of bottles having either aluminum labels or foils are being washed.

TABLE I—Analysis of solutions taken from soaker of bottle washer in which bottles having aluminum labels were washed

Number of Cases of Bottles Washed	Per Cent Sodium Aluminate in Soaker Solution	
	First Compartment	Second Compartment
2,000	0.18	0.23
6,000	0.53	0.70
10,000	0.88	1.20

TABLE II—Comparison of results of the two methods of testing for caustic in soaker solutions

Sample number	Alkalies actually in sample	Result using regular A.B.C.B. caustic test	Result using modified caustic test
1	3% caustic soda	3 %	2⅞%
2	3% caustic soda 2% Trisodium Phos.	3 %	2⅞%
3	3% caustic soda 2% Sod. carbonate	3 %	2⅞%
4	3% caustic soda 1⅛% sodium metasilicate	3¼%	3⅛%

Abstract of paper read before 1939 Convention, ABCB.

New Bag Preserves Flavor With Inert Gas

Seals product in carbon dioxide and is impermeable to air and moisture. Increases sale of coffee 300 per cent.

"VACUUM pack freshness at paper bag costs." That tells, with pardonable exaggeration, the story of the new heat-sealed Pliofilm-lined paper bag recently adopted by several large regional coffee roasters. That there is no small degree of truth in the slogan is borne out by the merchandising results. To cite a specific case, Wm. Montgomery Co., Philadelphia, has boosted the sales of its Rival Blue coffee 300 per cent since putting it into the "Flav-O-Tainer" bag five months ago. Altogether, eight large regional roasters are putting thirteen brands of coffee up in this bag, and the manufacturer of the container expects more than 50 to be on the bandwagon by June.

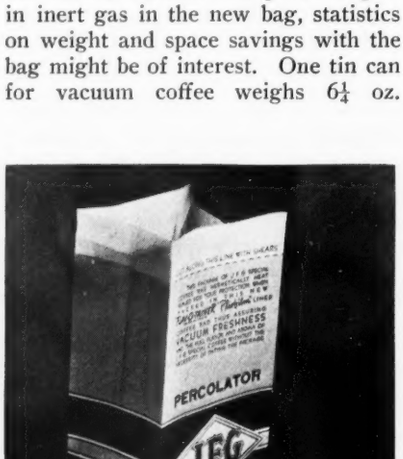
The principle of preservation embodied in this bag is new as far as paper containers are concerned. And it is a principle that not only is a "natural" for packaging coffee but has possible application to other food products. The principle is this: It is possible to displace the air in the container with inert gas when filling it, thereby protecting the flavor of the product against the deteriorating effects of oxygen. In practice 90 to 95 per cent of the air in the bag is displaced by carbon dioxide. The Pliofilm lining will keep air and moisture from passing into or out of the bag. But it will permit the carbon dioxide discharged by coffee after packaging to escape so as not to burst the container. The material has the happy faculty of being permeable to the gas yet impermeable to air and moisture. Since the Pliofilm is moisture-proof, the package also protects the product from a second important deteriorating agent.

If other foods are packed in the container in an atmosphere of carbon dioxide, the products will be protected against oxygen and against gain or loss of moisture. But the package will do a peculiar thing. As the inert gas escapes from inside, the container will be pressed tightly against the product by the atmospheric pressure outside, as it would if a vacuum were pulled on the container.

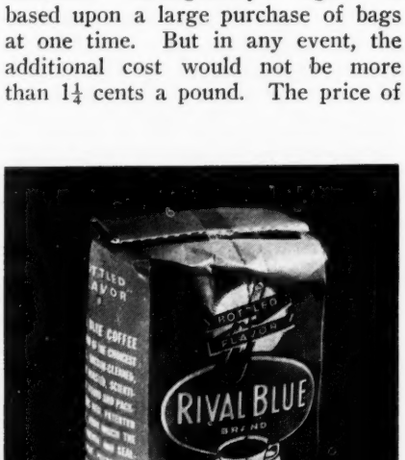
How long will coffee remain fresh in the Flav-O-Tainer bag? The manufacturer of the bags says 60 to 70 days. But before adopting the package, Wm. Montgomery Co. kept coffee in it for 172 days and found the product marketable at the end of that time. This compares to the 16 or 18 days of shelf life for coffee in a glassine lined paper bag and six to nine months for vacuum packed coffee. In commercial practice, the Rival Blue brand of Wm. Montgomery Co. ordinarily is on the shelf not more than two weeks before it goes into consumption. Deliveries to dealers are weekly. But the company concedes that it would be perfectly feasible for a roaster to make less frequent deliveries and thereby cut distribution costs.

For those coffee roasters who might consider taking a vacuum-packed brand out of the vacuum and preserving it in inert gas in the new bag, statistics on weight and space savings with the bag might be of interest. One tin can for vacuum coffee weighs 6¼ oz. empty, while the Pliofilm lined paper bag weighs one-third ounce. The can is 5 in. in diameter and 4 in. high, a case measuring 15x20x8 in. The same amount of coffee in the bags would occupy a space approximately 6x20x10 in., the paper bags not being packed in the same manner as the tins. Compared with glass vacuum jars the weight and space savings would be even greater than with tin.

So now you come to costs. As would be expected, the better thing is the more expensive. And a pound of Rival Blue coffee in the new container costs Wm. Montgomery Co. exactly 1⅛ cents more than a pound of it in the ordinary paper container. This includes the extra cost of the bag, slightly higher cost in the filling and sealing operations and a little more expense for cartoning. The bag itself costs about 1 cent more, leaving the ⅛ cent to cover the production cost increase. Montgomery's figure is based upon a large purchase of bags at one time. But in any event, the additional cost would not be more than 1¼ cents a pound. The price of



The paper bag with the Pliofilm lining is making history in the packaging of coffee. It has wider possibilities.



Sales have increased 300 per cent since this coffee has been packed in the Flav-O-Tainer.

Five people work on the production line which packages coffee and carbon dioxide in the Flav-O-Tainer bag at the plant of Wm. Montgomery Co. From left to right, woman is filling bag, girl is preparing bag for sealing, next girl is heat sealing lining, man is folding top of bag and fastening it down with tape, and second man is putting bags in cartons. The last man also opens bags ahead of filling machine.

the Flav-O-Tainer bag has been quoted at approximately 1¾ cents each. Additional equipment needed on the packaging line costs $400.

Because of the cost factor, the bag is being used principally for medium and high priced coffees. Rival Blue, for instance, sells normally at 20 cents a pound. Which brings up a little problem of merchandising. That is how to get consumers to buy at a premium in price a pound of coffee packed in what from the outside appears to be an ordinary paper bag. Montgomery got around this by an introductory one week price of 18 cents. This price permitted the housewife to keep within her budget and still test the truth of the better flavor theme put across by point of sale promotion. Which is what the housewives did. And their findings in regard to flavor preservation made them willing to pay more when they came back for a repeat purchase after the introductory price had been discontinued.

Montgomery has employed this merchandising technic repeatedly during the five months Rival Blue has been on the market in the new bag. During one week out of each month the price of the brand is dropped to the introductory level to attract new customers for conversion into repeat buyers through the better quality of the product.

Somewhat more promotional effort has been put behind the brand by Montgomery since it was put into the new bag. At point of sale, window posters, counter cards and circulars have told the story of "Bottled Flavor." Since May, the number of dealers selling Rival Blue has been doubled. When the new container was adopted, salesmen contacting dealers carried around with them a Pliofilm bag filled with water to show the imperviousness of the new container. This was effective in putting the story across. One thing about the bag that particularly pleases dealers is that it does away with customer complaints about staleness. The sales of Rival Blue are through independent stores in the area lying within a 60 mile radius of Philadelphia.

When the Pliofilm lined bag is filled and sealed, it looks like an ordinary bag. But there are several differences, aside from the lining. This bag is made in the plant of Thomas M. Royal & Co., Philadelphia, on a modified bag forming machine. The machine is fed with a roll of printed bleached kraft paper and a roll of Pliofilm. Sheets of the two materials are superimposed, die-cut and formed into an open-top container, with a photocell controlling the register of the label printing. The machine tacks the two materials together with adhesive in a few places to hold the lining to the outside wall of the bag. And it heat seals the Pliofilm at the bottom then seals the paper at the bottom with adhesive. The bottom formed is what is known as the old fashioned flat bottom, not the automatic flat bottom, the former being employed because it permits a tight seal. At the top of the bag, the paper is cut away on the sides to permit effective heat sealing of the Pliofilm lining after the bag has been filled.

The method of filling and sealing the bag can best be seen by considering the operations in a plant that uses it. So let's take a look at the production line in the plant of Wm. Montgomery Co. The company, of course, buys the bags already formed. So the first operation is to spread the sides of the container apart for filling. The automatic flat bottom bag ordinarily used for coffee can be opened for filling by a mere flip. But with this container the hand must be inserted into the bag to push the sides apart. After opening, a number of the bags are placed on the table ahead of the filling machine, being stood on their bottoms and leaned against a supporting wire; they do not stand up as well when empty as do bags with the automatic flat bottom. Then they are placed one at a time under the spout of the semi-automatic filling machine, which measures out the correct weight of coffee and discharges it into the bag simultaneously with the carbon dioxide. (This type of bag can also be used on fully automatic equipment.) The inert gas, supplied through a pipe inside the filling spout, flows into the bag much like water, because it is heavier than air. And being heavier, it forces the air out of the bag and takes its place in the container.

After the bag is filled, the Pliofilm lining is heat sealed at the top in a machine supplied by Thomas M. Royal & Co. The operator of this machine takes the bags from the table, places the Pliofilm between the heat sealing elements and presses a foot lever to make the seal. It is not necessary to make the seal immediately, as the carbon dioxide will stay in the open bag for several seconds. The next operation is folding over the top of the outside paper bag and sealing it down with transparent tape. Then the package is placed in the carton, twelve being packed to the carton instead of 24, as ordinarily done. Five people work on this production line at the Montgomery plant. The bags at present are filled at a rate of fourteen a minute. The sealer, however, will handle 50 a minute.

Carbon dioxide for this packaging operation is purchased in cylinders. Six of these are connected to a common header, and three are drawn on at one time. This system is used to reduce the rate of expansion, and hence the refrigerating effect, in any one cylinder. Too rapid an expansion will freeze up the system. The cost of the carbon dioxide per pound of coffee amounts to very little. For 1,000 lb. of coffee only 19 to 21 lb. of carbon dioxide is required.

What Makes a World's Fair EXHIBIT *Click*

Experiences of Food Exhibitors at New York World's Fair Point the Way to Promotional Methods Which Produce Results

By
IVAN C. MILLER
Distribution Editor,
FOOD INDUSTRIES

Part I

MEASURED by attendance, food stole the show at the 1939 New York World's Fair, though by other measurements, foods showing was less impressive. The 1937 Census of Manufactures reports approximately 160,000 manufacturers. Approximately 1,600, or one out of every 100 exhibited at the Fair. Of the country's 160,000 manufacturers almost 50,000 process food. Twenty-eight food processors exhibited at the Fair, just about one food manufacturer in every 1,800.

Food buildings attracted a large portion of the visitors at the Fair. Food Building North, housing sixteen food manufacturers' exhibits, attracted a larger portion of the visitors than any other Fair-constructed building (see table).

General Motors' "Futurama", to see which a waiting line formed early every day, accommodated but 28,000 daily visitors, not over 5,000,000 during the 180 days the Fair was open. The "Futurama" was a high light of the fair. However, Food North, in which many processors exhibited, attracted over 5,700,000 visitors during the Fair season.

Food buildings and food exhibits played to larger audiences than any other group of exhibits at the Fair. The results obtained varied in proportion to the quality of the exhibit. The quality of food exhibits varied from outstanding to mediocre.

Estimated Paid Attendance in 1939

Fair-Constructed Buildings

Business Systems & Insurance (two buildings)	6.8%	1,755,572
	11.2%	2,891,553
Communications	19.3%	4,982,732
Consumers	13.8%	3,562,781
Electrical Products	12.7%	3,278,792
Food Building North	22.1%	5,705,615
Hall of Industrial Science	4.1%	1,058,507
Hall of Pharmacy	13.8%	3,562,278
Home Building Center	7.6%	1,962,112
Home Furnishing Building	12.3%	3,175,523

Percentages are based on each building's proportion of the gate on days they were simultaneously clocked applied to total gate for the season.

Objectives

Food manufacturers attempted through World's Fair exhibits to advertise company and products, obtain publicity, consummate sales and build good will. Some exhibitors aimed at one objective, some another. The approach varied, so did the results.

The objective of Loose-Wiles Biscuit Co. was mainly to obtain publicity and impress dealers. Using small space, (about 1,000 sq.ft.) in Food Building North, Loose-Wiles entertained visitors with a lively show. Midgets, dressed as bakers, attracted crowds to their vaudeville performance and plugged Loose-Wiles' products from an elevated stage. Result: Publicity. The interest of the watchers impressed visiting retailers. Result: Invitation issued to Loose-Wiles to bring the Loose-Wiles Midget Show to food shows and conventions throughout the coming year.

Another food manufacturer whose primary target was the distributor, was Wm. Wrigley, Jr. Co. The Wrigley exhibit represented the change counter of a typical store, enlarged to many times actual size, and displaying numerous familiar grocery items. The display which magnified a few square feet of store counter to cover several thousand square feet of exhibit space, was intended to impress dealers with the importance of display, particularly the value of large displays of small packaged items such as chewing gum. During the early months of the Fair, many visitors passed the Wrigley exhibit, intrigued

Bottling at Borden's attracted early morning visitors.

Consumers try Birds Eye frozen food samples.

Crowds line up for samples of products of General Foods.

Loose-Wiles midgets held the audience, impressed dealers.

A line forms to sample products of H. J. Heinz Co.

Canada Dry sold 300,000 drinks during the Fair season.

THE 1939 New York World's Fair is over. By now most processed foods exhibitors have balanced books, crediting to the World's Fair inventory assets gained and profits accrued. There are debits, too, which appear on the ledger—few, if any, however, in the totals column. These few debits result from the failure to reap the full benefit of the opportunity. They are the results of errors in design or layout of the individual exhibit, the absence of adequate showmanship, the failure to utilize to the maximum the opportunity to get a message over or leave an idea—to create good public relations. The 1940 New York World's Fair is ahead. Most 1939 food exhibitors will return next year. They look ahead to greater accomplishments in 1940.

The accomplishments and failures of the 1939 New York World's Fair food exhibits, as outlined in this article, should be helpful and serve to guide every food manufacturer who exhibits at food shows or conventions, or who attempt to use showmanship and bood merchandising in presenting his product to consumers or distributors.

The demonstration of cake baking was followed by many purchases of the special "Bake-a-Cake Kit" offer.

by the proportions of the grocery items, but unaware of the exhibitor's identity. Before the Fair was half over, a consumer attraction was added. About a million visitors addressed envelopes to themselves. Gum samples were mailed to them later.

Some food processors faced a definite distribution problem which they hope to solve, in part at least, by a Fair exhibit. Taylor Provision Co., one of these, faced the problem of teaching and convincing consumers that its "Pork Roll" was not a prepared cold cut to be sliced and eaten cold like bologna, but was made to be cut thick and fried or broiled. Sales in territories where the product was served cooked were more satisfactory than where the product was served as a cold cut.

Less Sampling at 1939 Fair

Free sampling was less indulged in at the New York Fair than was the custom at previous fairs. Only five food exhibitors gave free samples. Beech-Nut Packing Co., for many years staunch advocate of sampling, gave away samples of several of their products, gum, candy and hot coffee. Electric eyes at the entrance to Beech-Nut Building counted over 5,000,000 visitors. Colorfully dressed attendants at the Chris. Hansen Laboratories' exhibit prepared Junket Folks products, passed out samples to most of the 5,700,000 visitors in Food Building North. General Foods Co., occupying approximately 2,000 sq.ft. in the same building, sampled 20,000 visitors a day with several of the company's products. Among these was the Birdseye brand of frozen berries.

In an area of not over 400 sq.ft., Taylor Provision Co. installed a small grill to demonstrate how to cook Taylor Pork Roll. Generous servings were prepared and sold to always-hungry Fair visitors. Attendants were able to instruct many who stopped at the exhibit in the art of properly preparing the company's product.

Probably the only food exhibitor to give away a souvenir as well as samples of products was the H. J. Heinz Co. The Heinz pickle, souvenir of many past fairs, was again the pride

Cooking "Quick Fudge", new product of Chr. Hansen's Laboratories, was demonstrated at the Fair. Sampling stimulated sales.

of souvenir hunters at the 1939 Fair.

At least half of the 1939 food exhibitors sold their products at their exhibits, attempting thereby to advertise and create good will and at the same time reduce the cost of the exhibit investment. Sterling Cider Co. used its Fair exhibit to introduce a new product, a sparkling naturally fermented champagne-like apple drink. The chilled beverage was sold at the counter, also the bottled product to take away.

Exhibitors' Food Sales High

Demonstrators at Chris. Hansen's Laboratory exhibit cooked Junket-quick fudge, sampled the audience and sold the packaged product. General Foods, too, used demonstrators who prepared meals of quick-frozen foods and baked cakes, made of General Foods products. After a cake baking demonstration sales of "Kate Smith Bake-a-cake Kits", which included five General Foods products used for preparing a chocolate cake, skyrocketed.

Taylor Provision Co. sales of grilled pork roll went far toward covering the cost of the company's exhibit. The restaurant in which G. Washington Coffee Refining Co. products were served and sold probably broke even if it did not actually earn a profit on the thousand square feet of restaurant and exhibit. The result from this exhibit was economical promotion.

The cash register at Canada Dry's exhibit took in 300,000 nickels from visitors who bought a glass of Canada Dry ginger ale. This return did not pay for the 2,000 sq.ft. Canada Dry occupied, but the income was close to operating cost. One out of every five visitors purchased a drink. Canada Dry estimates the cost of the exhibit at approximately 2½ cents per visitor.

The Show's the Thing

At least six food exhibitors believed "The Show's the Thing" to draw the crowd and expose them to product and promotion. Entertainment, of itself, they believed builds good will, and makes the audience receptive. National Biscuit Co.'s exhibit was a 3,000 sq.ft. movie theater where a "Mickey Mouse" film in color was continually on the screen. The movie showed Mickey climbing back into Minnie's good graces when he ended Minnie's distress over cooking disasters with a present of National Biscuit Co.'s food products. Among other attractions, Planters Peanut Co.'s exhibit contained a miniature movie which illustrated by animated cartoon "How the Peanut Grows." Planters made cash sales to 190,000 customers.

Standard Brands and Libby McNeil and Libby packed them in with puppet shows. The puppets in Standard Brands' show were the characters in the Chase & Sanborn radio hour, supported by a puppet cast of Standard Brand products. Standard Brands' puppet auditorium was filled for every show. Libby's puppets were Libby products. Nearby were refreshment stands where Libby's fruit juices were on sale, at 10 cents per serving. Weekday sales reached as high as 2,000 servings, week-end sales as high as 6,000 servings.

Beech-Nut Packing Co. featured the big tent, a circus and parade with floats representing Beech-Nut products, and a circus announcer ballyhooing over a loud speaker to give atmosphere. The mechanically operated show was continuous. Loose-Wiles midget show has already been mentioned.

Exhibitors Show 'How It's Done'

The innovation in this year's Fair was the increased use of "How It's Done" features of salesmanship, to pull them in and convince them. The results were more than gratifying.

Standard Brands, in a part of the company's exhibit, roasted Chase & Sanborn coffee, illustrated how it was packaged and dated, and explained how it was "delivered daily." Aroma of the roasted and brewed coffee filled the air. Visitors lined up to await a turn to sit and drink at the coffee bar. Swift & Co. showed how hams were cured, how frankfurters were made, stuffed and smoked, and how bacon was sliced and packaged. The Swift building and grounds covered 100,000 sq.ft.

More than 4½ million cookies were mixed and baked during the Fair season at this exhibit. Sales were made to 145,000 customers.

Entering at one door in Continental Baking's exhibit and following the crowd, 4,419,757 Fair visitors learned how Continental's Wonder Bread and Hostess cakes are made. They watched the flour and other ingredients automatically and scientifically weighed, mixed, kneaded, raised and proofed in an air-conditioned room, cut, weighed and formed into loaves, baked in continuous ovens and machine-wrapped. Next visitors saw the baking, mixing and wrapping of Hostess cup cakes. "Seeing is Believing". This exhibit told a convincing story. Continental Baking Co. sold 954,500 packages of cup cakes during the Fair season.

One exhibit in the National Dairy Products Co.'s building illustrated for visitors "How it was done" by featuring two girls packaging Kraft cheese.

Each performance of Standard Brands' puppet show played to a full house.

Borden's popular glassed in "Rotolactor" where cows were mechanically milked presented a dramatic show, drew a big crowd.

Interested faces usually filled the space around this glassed-in "how it's done" exhibit. The promotional value of a "how it's done" exhibit is no better illustrated than in the case of exhibits of Northwestern Yeast Co. and Wagner Baking Co's exhibit of making Mrs. Wagner's Pies. When the "pretzel-bender" was shaping dough into pretzels, a crowd gathered, pretzel sales zoomed. When Mrs. Wagner's pies were in preparation or coming from the oven, the serving counter seats were filled with apple-pie-eating visitors. Counter sales peaked with "how it's done" operations, slumped when the action ceased.

Coca-Cola operated continuously a bottle-filling line and a Mickey Mouse animated movie in Food Building South. The bottling line was a stopper. Many visitors who visited Food Building South watched "how it's done" and lined up at the refreshment counter which extended the length of the bottling line.

The Drake Bakeries Co. exhibit not only let visitors know "how it's done" but also how good it smells. In a small building, Drake Cake Co. mixed and baked cookies in full view of visitors. The aroma at baking time filled the air. The Drake exhibit attracted over 2,000,000 visitors who watched the baking of 4,797,500 cookies. Drake Bakeries Co. made 145,000 counter sales.

Nearly 8,000,000 Fair visitors stopped and "Ah-ed" at the Borden Co. exhibit. Almost every foot of Borden's 80,000 sq.ft. exhibit was a show. No matter from which direction the exhibit was approached, front, back or at the sides, some attraction arrested attention, and invited the visitors to see the rest of the show. The sides and rear of the glassed-in building permitted visitors to see cows, bulls and calves at rest, cows in motion, cows milked. The main entrance was like a vortex which drew in the crowds to view the mechanical milking operations, missing few that came near the building.

Borden's was a "how it's done" exhibit. This exhibit combined all the elements of showmanship demonstrated by food exhibitors except distributing free samples. Borden's sold the dairy products of the cows, machine-milked on the Rotolactor, at a milk bar and in the Borden restaurant.

Food buildings and exhibits at the 1939 New York World's Fair were popular. They were well attended. If any food manufacturer who exhibited at the 1939 World's Fair failed to obtain ample returns for the investment the blame can only be placed on his act. He did not put on a good show.

EDITOR'S NOTE: The 1939 New York World's Fair was at FOOD INDUSTRIES' front door, a 30-minute ride from the office. During the 1939 season one of the members of FOOD INDUSTRIES' home office staff visited the New York Fair almost every day to study the exhibits of food manufacturers.

An analysis of the elements of exhibits which produced results and mistakes to be avoided in preparing and conducting a Fair exhibit will appear in Part II of this article, in the February issue of FOOD INDUSTRIES.

FREEZING Makes Beef Tenderer

Below zero temperatures most effective

By O. G. HANKINS and R. L. HINER[1, 2]
United States Department of Agriculture, Washington, D. C.

TENDERNESS is generally recognized as one of the most important characteristics of meat. In fact, when meat has a low degree of tenderness, to many people it is quite unsatisfactory, although it may be thoroughly desirable with respect to other characteristics. Therefore, any factor that has an effect on tenderness is of definite concern to the consuming public. Recent years have seen a greatly increased use of temperatures below the freezing point in the preservation of fresh meat, and this development has brought into the foreground many problems. A number of these relate to the quality of the product. One of the more important of these problems on quality has to do with the relative effects of different freezing temperatures on tenderness.

Although a rather large amount of research has been reported on various phases of the low-temperature problem in relation to meat, it appears that little work, if any, has been done which bears directly on the present subject. However, it seems desirable at least to mention the report of Tressler, Birdseye and Murray (5) that quick freezing makes beef tenderer. In that research, the comparison was between chilled and quick frozen meat, and study was not made of the effects of different freezing temperatures. Also, these workers used penetrometer readings on raw lean as the measure of tenderness. Mandeville in a review of the literature (3) places emphasis on enzyme activity as a cause of meat becoming tenderer. He also points out that such activity continues, but at a greatly reduced rate, at temperatures slightly below the freezing point and even more slowly as temperature is lowered further. He concludes that tendering, in the case of poultry, which is his special interest, is likely to be practiced, if at all, before the birds are frozen. This review does not touch upon freezing or difference in freezing temperature, *per se*, as a cause of meat becoming more tender.

Four pairs of beef short loins were used in this study. They were obtained from the carcasses of four Shorthorn steers produced at the Agricultural Research Center, Beltsville, Md. The steers were fed and handled under uniform conditions and were slaughtered at different times as they individually reached a weight of approximately 900 lb.

After storage of each carcass for about 96 hours at 34 deg. F. (+1.1 deg. C.) the two short loin cuts were removed. Beginning at the posterior ends of the short loins, eight pairs of steaks were cut, each steak being 1.5 in. thick. The first steak cut from the short loin of the left side of the carcass was designated as No. 1, the second as No. 2, and so on. The corresponding pair mates from the right side of the carcass were designated as No. 1*a*, No. 2*a* and so on. The steaks numbered 1, 2, 3 and 4 were regarded as coming from the left rear quarter; 5, 6, 7 and 8 from the left front quarter; 1*a*, 2*a*, 3*a* and 4*a* from the right rear quarter, and 5*a*, 6*a*, 7*a*, and 8*a* from the right front quarter of the two short loin cuts considered as a unit.

Four temperatures were used in the study. One of them, the control temperature, was above the freezing point, at the storage temperature of +34 deg. F. (+1.1 deg. C.) mentioned above. The other experimental temperatures were +20 deg. F. (-6.7 deg. C.), -10 deg. F. (-23.3 deg. C.) and -40 deg. F. (-40 deg. C.). In no case did the deviation from the experimental temperature exceed ±2 deg. F. On the fifth day, or approximately 120 hours after slaughter of the animal, each steak was weighed to the nearest one-hundredth of a pound and treated as a control sample or placed in its assigned freezing temperature, as the case might be. The assignment of experimental temperatures to the sixteen steaks from each carcass was done at random, except that four steaks were treated at each temperature and each temperature was represented once in each quarter of the carcass sample, the sample consisting of the two short loins. Also, considering the four carcasses, there was an equalization of temperature comparisons. That is, for example, -10 deg. F. was placed horizontal with each of the experimental temperatures an equal number of times, although the position in the quarter or side was at random. The assignment of temperatures to steak samples in accordance with this modified random plan (see Table I) was done for the purpose of making the differences between means more clear cut.

ON the same day that the other steaks from a carcass were placed in the freezers, the four control steaks were tested for tenderness. This was accomplished by first heating in a ventilated electric oven at a temperature of 392 deg. F. (200 deg. C.) until they reached an internal temperature of 136.4 deg. F. (58 deg. C.), removing them from the oven and allowing the internal temperature to rise to 140 deg. F. (60 deg. C.). They were then tested for tenderness by means of the shearing-strength device developed by the B.A.I.[1]

Determinations made on cooked meat with this apparatus in a number of other studies have been found closely related to observations on

[1] This paper was presented on Nov. 25, 1938, at the annual meeting of the American Society of Animal Production, under the title "Tenderness of Beef As Affected by Different Freezing Temperatures."

[2] The authors wish to give credit to Mrs. Tentie G. Johnson for assistance in the statistical analysis of the data.

tenderness made by judges, but, comparing the two methods, the present writers regard the apparatus as more consistent and dependable than the human being. Under strictly uniform technic, three samples were taken from the *longissimus dorsi* muscle of each heated steak and three shearing strength determinations made on each sample. To avoid the possibility of surface drying affecting the results, the three shearing strength determinations were made at 25, 50 and 75 per cent of the distance between the anterior and posterior sides of the steak. The nine determinations were averaged to give a single value representing the tenderness of the steak.

Each of the steaks subjected to freezing temperature was allowed to remain in the freezer at the prescribed temperature until that same temperature was attained at the center of the *longissimus dorsi* muscle. The steak was then removed and placed in a +45 deg. F. (+7.2 deg. C.) room to thaw. After thawing, the same procedure was employed as described above for control steaks.

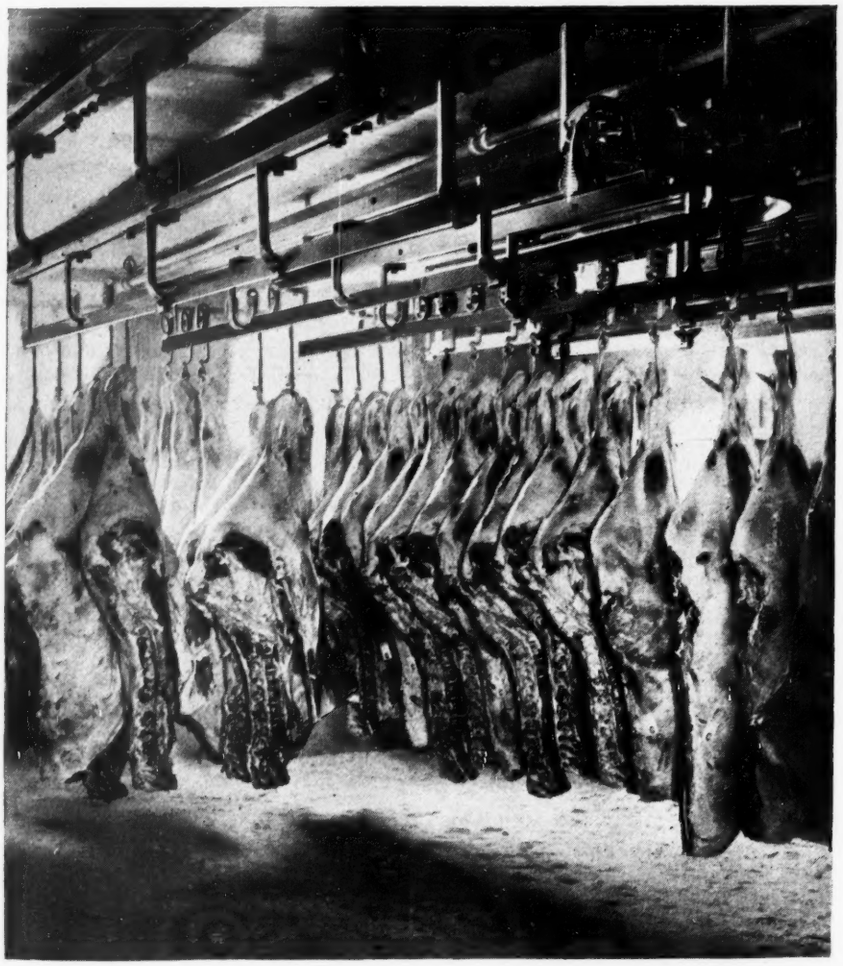
It will be noted first in Table II that there was not a great amount of variation in the average initial or fresh weights of the four groups of steaks, nor was there much change in weight associated with freezing and thawing in any of the groups, although the +20 deg. steaks lost an average of 0.04 lb. and the –10 deg. steaks an average of 0.01 lb., while the –40 deg. steaks maintained their weight.

It is especially interesting that the +34 deg. steaks had a definitely higher shearing strength, or were less tender, than any of the groups which were frozen. Also, it is particularly noteworthy that the steaks frozen at –10 deg. and –40 deg. F. were more tender than those frozen at +20 deg.

No real difference was found between the groups frozen at the two lowest temperatures. The decrease in force required to shear the +20 deg. steaks, below that required by those not frozen, was approximately 12 per cent. With both the –10 deg. and –40 deg. steaks, the decrease was approximately 18 per cent, or 50 per cent more than for the +20 deg. steaks.

Although this project was not designed to study the relation of the individuality of the animals to the tenderness of the meat, it is desired to state at this point that the average shearing-strength values of the steaks from the four carcasses were 33.0, 28.1, and 22.6 and 22.2 lb. Further reference is made below to the factor of individuality.

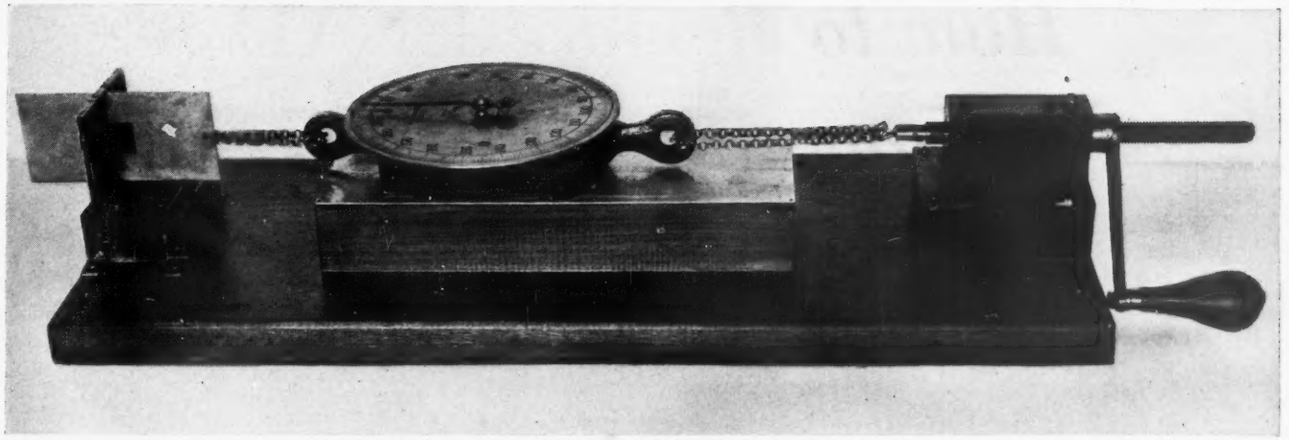
To obtain further information on the various relationships involved, an analysis of variance was made according to the method (4) outlined by Snedecor. As shown in Table III, about 67 per cent of the total variance in tenderness among the 192 samples from the 64 steaks was accounted for by differences between the four ani-



Beef chilled to the usual above-freezing temperatures is not as tender as beef that has been frozen.

TABLE I—Assignment of Temperatures to Samples

Carcass No. 1				Carcass No. 2				Carcass No. 3				Carcass No. 4			
Left side		Right side		Left side		Right side		Left side		Right side		Left side		Right side	
Sample No.	Temperature	Sample No.	Temperature	Sample No.	Temperature	Sample No.	Temperature	Sample No.	Temperature	Sample No.	Temperature	Sample No.	Temperature	Sample No.	Temperature
Rear quarters of short loin															
1	−10	1*a*	+34	1	−40	1*a*	+34	1	−40	1*a*	−10	1	−10	1*a*	−10
2	−40	2*a*	−10	2	−10	2*a*	+20	2	−10	2*a*	+34	2	+20	2*a*	−40
3	+20	3*a*	+20	3	+34	3*a*	−40	3	+34	3*a*	+20	3	−40	3*a*	+20
4	+34	4*a*	−40	4	+20	4*a*	−10	4	+20	4*a*	−40	4	+34	4*a*	+34
Front quarters of short loin															
5	−40	5*a*	−40	5	−40	5*a*	+20	5	+34	5*a*	−10	5	+34	5*a*	−10
6	+34	6*a*	+20	6	+34	6*a*	+34	6	−40	6*a*	−40	6	+20	6*a*	+20
7	−10	7*a*	−10	7	+20	7*a*	−10	7	−10	7*a*	+20	7	−40	7*a*	+34
8	+20	8*a*	+34	8	−10	8*a*	−40	8	+20	8*a*	+34	8	−10	8*a*	−40



With this apparatus was determined the tenderness of beef frozen at different temperatures. The findings are significant.

mals or carcasses. Such variance was not unexpected, as in previous work differences in tenderness have been found (6) to be associated with differences in breeding or individuality.

Table III shows further that approximately 16 per cent of the total variance in tenderness was due to the temperature differences. In addition, approximately 3 and 7 per cent were associated with location in the short loins, considering the left and right sides and the front and rear halves, respectively. The remainder of the variance, consisting of about 7 per cent, is ascribed to interactions and experimental error.

In the analysis of the data from this study it is probable that the most important question relates to the significance of the differences between mean tenderness values for the several temperature groups of steaks. As pointed out above, the tenderness of all three groups that were frozen was greater than that of the +34 deg. group. Through further calculation it was found that in all three instances the difference in tenderness, that is between the +34 deg. group on one hand and the +20 deg., –10 deg. and –40 deg. groups on the other hand, was highly significant (2), the probability being less than 0.01. Thus, all freezing temperatures studied are shown clearly to have made the meat more tender.

Comparing –10 deg. with +20 deg. and –40 deg. with +20 deg., it was found in both instances that reducing the freezing temperatures resulted in a statistically significant increase in tenderness. The probability of a significant difference between means in these cases was less than 0.05 but more than 0.01. Between the means for the –10 deg. and –40 deg. groups the difference was not significant. It is important to add that the effects of temperature on the steaks from the individual animals were consistent with the effects on the average steaks from all four animals.

No important difference in tenderness was found between steaks from the two sides of the carcass. However, the four steaks cut from the rear quarter of the short loin were significantly more tender than the four from the front quarter.

It is concluded that freezing steaks at +20 deg., –10 deg., and –40 deg. F. did materially increase their tenderness over that of unfrozen steaks; also that –10 deg. and –40 deg. had significantly more tendering effect than +20 deg. There was no real difference in effect between the two lowest temperatures and, therefore, –10 deg. would seem the more economical and practical for this particular purpose.

TABLE II—Average Shearing Strength or Tenderness of Steaks Subjected to Different Temperature Conditions. Average Weights of Steaks at Different Stages are Also Shown

Item	Temperatures			
	+34° F. (+1.1° C.)	+20° F. (−6.7° C.)	−10° F. (−23.3° C.)	−40° F. (−40.0° C.)
Number of steaks	16	16	16	16
Av. weight of steaks (fresh), lb.	1.91	1.86	1.98	1.98
Av. weight of steaks (frozen), lb.	....	1.83	1.97	1.98
Av. weight of steaks (thawed), lb.	....	1.82	1.97	1.98
Av. shearing strength, lb	30.0	26.3	24.5	24.6
Decrease in shearing strength based on average value for unfrozen steaks, per cent	....	12.3	18.3	18.0

TABLE III—Analysis of Variance in Tenderness of Steaks

Source of variation	Degrees of freedom	Sum of squares	Mean squares	Variance in per cent of total
Between means of animals	3	3,780.29	1,260.10	66.7
Between means of cuts				
Left vs. right	1	63.14	63.14	3.3
Front vs. rear	1	130.52	130.52[1]	6.9
Interaction (left and right) (front and rear)	1	42.08	42.08	2.2
Between means of temperature	3	911.43	303.81[1]	16.1
Interactions				
Cuts — animals	9	337.33	37.48	2.0
Temperature — animals	9	310.18	34.46	1.8
Experimental error	164	2,991.11	18.24	1.0
Total	191	8,566.08	.....	100.0

[1] Significant.

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How to Remove LEAD *from Maple Sirup*

Traces of it and other heavy metals can be precipitated and filtered out

By AUGUSTUS CONLIN
Cary Maple Sugar Co., Inc., St. Johnsbury, Vt.

SEVERAL shipments of maple sugar from Canada were detained by the United States Food and Drug Administration in the early part of 1936. This sugar was found to contain lead in quantities which the Administration considered excessive. Further investigation of maple products produced in both the United States and Canada showed that there was sporadic lead contamination due principally to three causes:

1. Terne plate (leaded tin) equipment.
2. Equipment painted with lead containing paint.
3. Equipment containing excessive solder.

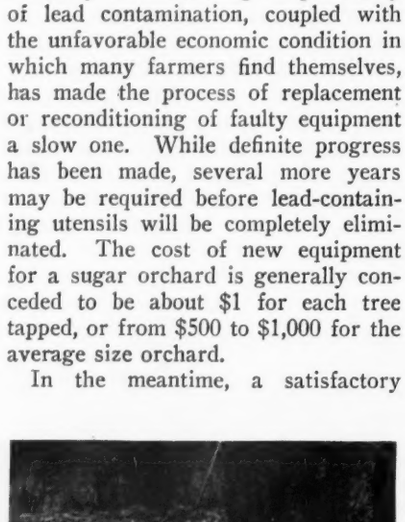
Having determined the cause of the lead contamination, the problem during the past three years has been to remove this cause. The complexity of this problem need not be discussed fully here, but a few words are necessary to demonstrate why the trouble could not be remedied immediately and why, therefore, a method for removal of excessive lead from maple products has been necessary pending the reconditioning or discarding of lead contaminating equipment.

It is estimated that there are between 40,000 and 50,000 producers of maple products, most of whom are farmers, in the United States and Canada. Each producer has his own equipment, which consists of sap buckets, spouts, several tanks for various purposes and an evaporator. The number of buckets and spouts each producer owns varies from a few hundred to several thousand, averaging somewhere between 500 and 1,000 of each. It is therefore obvious that the total number of individual pieces of equipment in use in the entire maple producing industry approaches, or perhaps exceeds, 100 million. Of course, much of this equipment is in a satisfactory condition and will cause no lead contamination. In the United States, it is estimated that not more than 10 per cent of the present equipment needs reconditioning or replacement, but in Canada the percentage is much higher. A considerable amount of research work has been done by private and state agencies in both the United States and Canada in an effort to find suitable protective coatings which could be applied to lead-containing equipment to prevent lead pick-up, and various types of materials for new equipment have been studied. The results of these investigations are now available to the producer. However, skepticism on the part of the producer regarding the necessity of eliminating all possibility of lead contamination, coupled with the unfavorable economic condition in which many farmers find themselves, has made the process of replacement or reconditioning of faulty equipment a slow one. While definite progress has been made, several more years may be required before lead-containing utensils will be completely eliminated. The cost of new equipment for a sugar orchard is generally conceded to be about $1 for each tree tapped, or from $500 to $1,000 for the average size orchard.

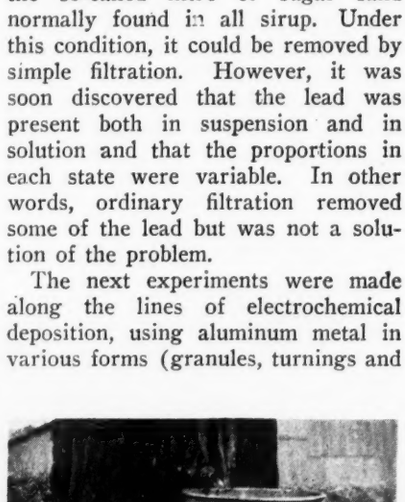
In the meantime, a satisfactory method for removing excessive lead has been developed, enabling the processors and packers of maple products to continue doing business without fear of sometimes being in violation of food law regulations. It is understood, of course, that the deleading process is merely a temporary expedient which it is necessary to employ on only a relatively small percentage of the United States crop and which will be discontinued as soon as the improved conditions of the producers' equipment make it no longer necessary.

When the presence of lead in maple products was first brought to the attention of the maple packers, it was thought possible that the lead might be present only in suspension along with the so-called nitre or sugar sand normally found in all sirup. Under this condition, it could be removed by simple filtration. However, it was soon discovered that the lead was present both in suspension and in solution and that the proportions in each state were variable. In other words, ordinary filtration removed some of the lead but was not a solution of the problem.

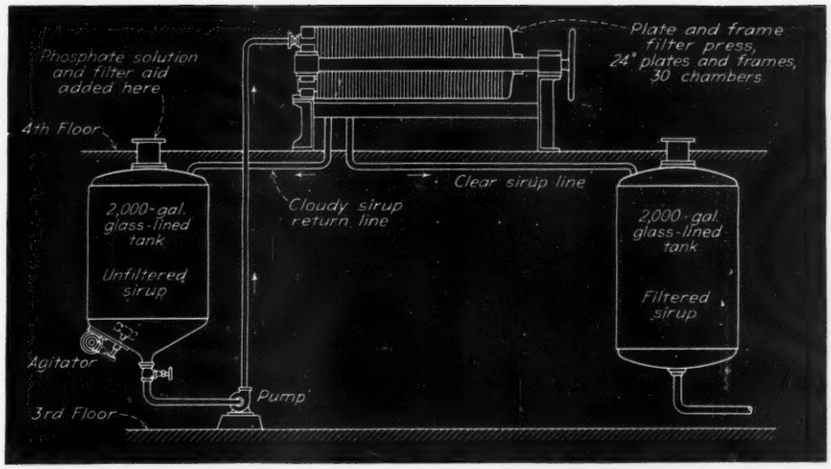
The next experiments were made along the lines of electrochemical deposition, using aluminum metal in various forms (granules, turnings and



Coated with a lead paint, this type of bucket contaminates the maple sap caught in it.



This terne-plate bucket, like the lead-painted one, permits the maple sap which it receives to take up lead.



With this equipment, lead and other heavy metals may be precipitated from maple sirup and removed by filtration.

dust) to displace the lead. Only the aluminum dust was effective, but such large quantities were necessary that the method was entirely impractical for commercial use. Moreover, the flavor of the sirup so treated was most objectionable. In any method of deleading, the effect on flavor is of prime importance. Upon this the value of maple products depends.

Lead precipitants were tried next. The most insoluble common lead compound is the phosphate. Any soluble phosphate should, therefore, react with the lead dissolved in the sirup and produce the insoluble lead phosphate which could then be removed by filtration. The various calcium phosphates were first employed and produced a noticeable lowering of lead content, but their use was limited because of their slight solubility. They were then replaced by the corresponding sodium compounds, which are much more soluble. A few experiments soon indicated that the sodium phosphates were excellent precipitants for the dissolved lead. The monosodium phosphate left a noticeable acidic taste in the finished sirup and because of its acidity was considered likely to promote inversion; but the di-sodium phosphate, solutions of which are slightly alkaline, proved to be satisfactory.

Calculation of the minimum amount of di-sodium phosphate necessary to remove the lead as completely as possible is complicated by the presence of traces of other heavy metals in the sirup which are also precipitated as phosphates. These other metals are principally zinc and iron which are picked up from metallic equipment in the same manner as the lead, although some of the iron is a normal constituent of maple sap. It should be emphasized that the amounts of these metals are extremely minute—so little that they are best expressed in parts per million. Theoretically, the amount of di-sodium phosphate necessary to remove only the lead is exceedingly small, even when the lead content is relatively high, such as 10 parts per million or more. For example, 1,000 gal. of maple sirup containing 10 parts per million of lead actually contains only 1.76 oz. of metallic lead and should require only about 0.8 oz. of di-sodium phosphate for complete reaction. However, much more than this is necessary because of the other metals present and because the lead phosphate is not absolutely insoluble. A trace of lead always remains in the finished product, the amount depending, among other things, upon the excess of precipitant used.

In actual practice, about 0.05 per cent di-sodium phosphate has generally been found adequate to lower the lead content of maple sirup from amounts ranging from 5 parts per million to less than 1 part per million. While there is no lead tolerance at all for maple products, this figure of less than 1 part per million is considerably below the quantity of lead (3.58 p.p.m.) permitted by the Food and Drug Administration in lead sprayed fruit products.

The maple product to be de-leaded must be in the form of sirup. The sirup is heated by steam coils up to 160 to 180 deg. F. in a suitable tank, preferably one lined with glass, while the proper amount of di-sodium phosphate is being dissolved in hot water. When the proper temperature has been reached, the sirup is agitated vigorously and the phosphate solution is added. The agitation is continued for a period of one-half to one hour while the temperature is held within the range mentioned above. At the end of this time the sirup is filtered.

Due to the nature of the phosphate precipitate, filtration is much more difficult than when the sirup has not been treated for lead removal. A good filter aid is necessary, but regardless of the type used the capacity of the filters is decreased by about 50 per cent, while the length of time required for filtration is increased. It is not likely that the retarding of the filtering operation is due entirely to the very small amounts of the heavy metal phosphates which are precipitated. The excess of di-sodium phosphate apparently reacts with some of the dissolved calcium salts, which are normal constituents of all maple sirup in amounts far exceeding the quantities of the heavy metals present. This results in the precipitation of calcium phosphate, which appears to be the main cause of the filtration trouble.

Filtering is done by means of a plate and frame press, the plates and frames being 24 in. square and the press containing 30 chambers. Two of the presses are arranged so that they can be operated together or separately. The normal capacity of one press when no de-leading agent is employed is 2,000 gal. an hour. For de-leaded sirup, the capacity is about 1,000 gal. an hour. So the two presses are usually operated simultaneously, the filtering unit being generally 2,000 gal. Furthermore, 1,000 gal. is about all we can get through a single press (in the case of de-leaded sirup) before the flow is so slow as to be impractical. The limit of a press filtering unleaded sirup is around 5,000 gal. These figures are subject to considerable variation since the amount of natural sediment in maple sirup is quite variable. But they demonstrate how the filtering process is slowed up by the de-leading agent.

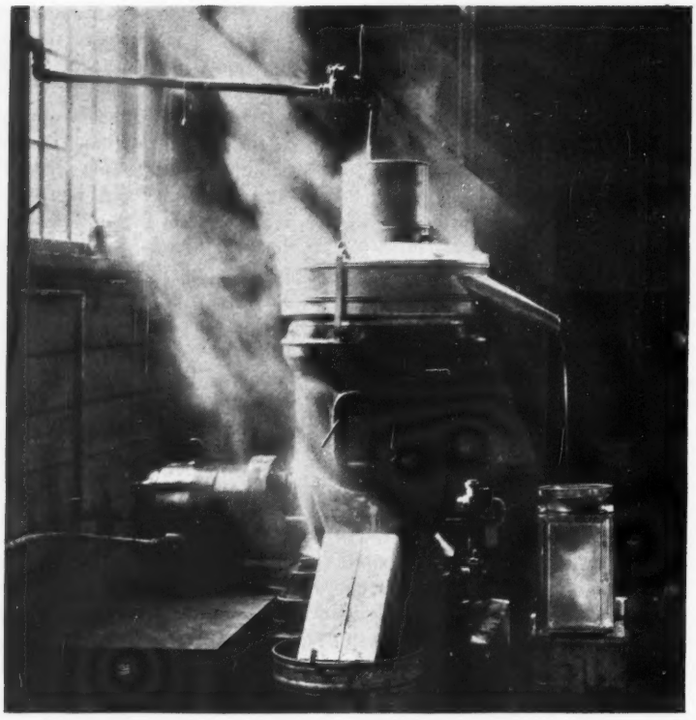
Undoubtedly, a special type of filter such as a pre-coat scraping filter would readily overcome this difficulty. The pre-coat scraping filter is a relatively new piece of equipment. It is a continuous vacuum filter especially suited for liquids containing colloidal or gummy substances. A traveling knife edge continuously removes a thin film of the pre-coat, leaving a fresh surface of filter aid exposed at all times.

During the past few years, many millions of pounds of both domestic and imported maple products have been successfully treated to remove excessive amounts of lead. It seems possible that the method described above, or some modification of it, might be applied to the removal of traces of heavy metals from other liquid food products.

Waste Utilized To Improve Quality of Product

Late season salmon brought up to par by addition of oil from inedible parts of fish

By HOMER CLOUKEY
The Sharples Corp., Philadelphia, Pa.



This centrifuge takes, from waste parts of the fish, the oil which brings the late season salmon pack up to the quality level of the early run fat fish. Packer and consumer both benefit.

ONE of the greatest difficulties in packing salmon has been that the quality of the fish drops off considerably from the early run to the fall run. The later runs yield a much paler, non-oily, unattractive pack when compared with the pack of early run fish.

Everyone knows how attractive is the red salmon colored pack of early run fat fish when emptied out of the can. There is no higher quality of canned salmon produced than well packed fish from the early run. So quality in the salmon pack is always associated in the mind of the public with a deep red salmon colored flesh and an oily liquid in the can. These characteristics, in turn, depend upon the percentage of natural salmon oil present in the flesh of the fish when the pack is made.

It has been determined by experiment and known for a long time that the quality of the late run fish is improved if the deep red colored natural salmon oil is added to it. About one tablespoonful of the oil to a 1-lb. can, added after processing the pack, makes the late run fish much more nearly uniform in color and quality with early run fish than any pack ever produced in any other way.

The real problem has been to secure, at a reasonable cost, the natural salmon oil in suitable condition for use. With the proper salmon oil available, the necessary additions can be made to secure a uniform pack from the beginning to the end of the packing season. Several years ago a method of obtaining the oil was worked out and is now common procedure, particularly on the Chinook salmon runs.

Salmon body parts, such as the head, the backbone and the tail, are carefully cooked under appropriate conditions to soften the flesh and release the oil from the cells. The fish solids and all the resulting juices are then centrifuged under appropriate conditions in bulk type centrifugals to free the oil from the solids and deliver it as an emulsion containing a considerable amount of water but free of solids. This oil is then recovered in sparklingly clear pure form by centrifuging the emulsion in supercentrifuges under the right conditions as to temperature, capacity and a high centrifugal force. The recovery of high grade salmon oil varies from 11.5 to 13 gal. from each 1,000 lb. of backbones, heads and tails.

The deep red salmon oil is clear, clean, sweet and dry. It is in the proper condition to store, either by the maker for use in his later packs or for sale to other producers of salmon packs who wish to have the oil for the later portion of their packing season.

The method of using salmon oil is extremely simple. It is added directly to the can before sealing, in a proportion suitable to bring the red oil content of the fish packed in the later portion of the salmon run to the standard of the oil content of the early run pack of the same season. While the maximum amount added is approximately one tablespoonful per 1-lb. can, the actual quantity used varies in accordance with the requirements necessary to maintain color uniformity in a given pack.

The economic result is beneficial to both the packer who uses this process and to the consumer. The packer secures a higher average price for a more uniform pack without a carry over due to poor grades. The consumer secures a better product, with a higher vitamin content than he would otherwise secure. Not the least of the benefits is a more attractive pack, which always increases the demand for and the consumption of a high grade product.

UNITED STATES DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service

TENTATIVE UNITED STATES STANDARDS FOR GRADES OF

DRIED PRUNES

(EFFECTIVE SEPTEMBER 11, 1939)

DEFINITION

DRIED PRUNES are whole ripe plums (*Prunus domestica*) from which the greater portion of moisture has been evaporated. Before packing, the dried fruit is commonly processed with boiling water or steam. The finished product contains in the fleshy portion not more than 24 per cent moisture by weight.

TYPES OF DRIED PRUNES

Dried prunes are, for the purposes of these grades, of two types:

Type I — French;

Type II — Italian.

SIZES OF DRIED PRUNES

When graded for size, dried prunes are sized as follows:

Type I —French—20/30, 30/40, 40/50, 50/60, 60/70, 70/80, 80/90, 90/100, 100/110;

Type II—Italian—25/35, 35/45, 30/40, 40/50, 50/60, 60/70, 70/80, 80/90, 90/100, 100/110.

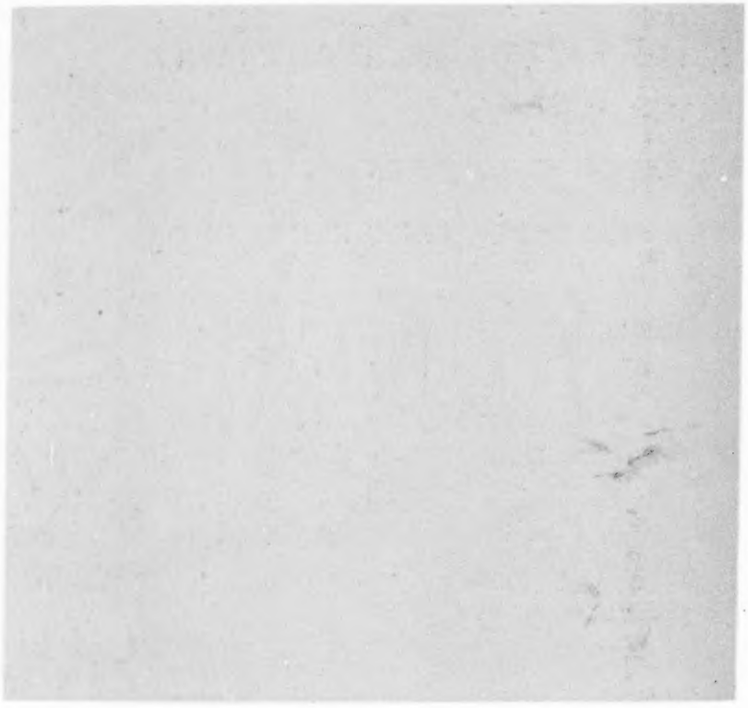
GRADES OF DRIED PRUNES

»» ***U. S. GRADE A or U. S. Fancy*** shall consist of dried prunes meeting the following requirements:

(a) The color of the skins shall be black, blue black, or reddish purple. Not more than 5 per cent, otherwise meeting grade requirements, may have a chocolate or "dead" lack luster color.

(b) The color of the flesh of the prunes shall be Golden Rod Yellow to Mirador Brown, as defined in Maerz & Paul "Dictionary of Color."

(c) Not more than 3 per cent of the prunes by weight may have flesh which is fibrous or woody, including not more than 2 per cent which will float in a salt (NaCl) solution of 1.18 specific gravity.



GOLDEN ROD YELLOW, as specified in the standard for grades of dried prunes, is shown at the left, and corresponds to Plate 10-L-5, Maerz & Paul, "Dictionary of Color," Munsell Reading 1Y 7.3/10.

(d) Not more than 5 per cent of the prunes, by weight, may have broken skins aggregating more than 3/8 inch in length, provided that not more than 3/5 of this amount or 3 per cent of the prunes by weight may have splits opened to the pit.

(e) Not more than 3 per cent of the prunes by weight may have tough thick scab, or scab of other character exceeding the area of a circle 1/2 inch in diameter.

(f) Not more than 2 per cent of the prunes, by weight, may show sunburn which noticeably changes the character of the skin or flesh.

(g) Not more than 2 per cent of the prunes by weight may be "slabs."

(h) Not more than 2 per cent of the prunes by weight may show insect injury or damage by means other than those mentioned in the text.

PROVIDED that the total of all defects mentioned in paragraphs (a) to (h) inclusive shall not exceed 10 per cent, but the total of defects mentioned in paragraphs lettered (c), (e), (f), (g), and (h) shall not exceed 3 per cent.

»» ***U. S. GRADE B or U. S. Extra Choice*** shall consist of dried prunes which meet the following requirements:

(a) The color of the skins shall be black, blue black or reddish purple. Not more than 10 per cent, otherwise meeting grade requirements, may have a chocolate or "dead" lack luster color.

(b) The color of the flesh of the prunes shall be Golden Rod Yellow to Mirador Brown, as defined in Maerz & Paul "Dictionary of Color."

(c) Not more than 3 per cent of the prunes by weight may have flesh which

MIRADOR BROWN, as specified in the standard for grades of dried prunes, is shown at the right, and corresponds to Plate 8-L-6, Maerz & Paul, "Dictionary of Color," Munsell Reading 5YR 2/3.

is fibrous or woody, including not more than 2 per cent which will float in a salt (NaCl) solution of 1.18 specific gravity.

(d) Not more than 5 per cent of the prunes, by weight, may have broken skins aggregating more than 3/8 inch in length, provided that not more than 3/5 of this amount or 3 per cent of the prunes by weight may have splits opened to the pit.

(e) Not more than 3 per cent of the prunes by weight may have tough thick scab, or scab of other character exceeding the area of a circle 1/2 inch in diameter.

(f) Not more than 2 per cent of the prunes, by weight, may show sunburn which noticeably changes the character of the skin or flesh.

(g) Not more than 2 per cent of the prunes by weight may be "slabs."

(h) Not more than 2 per cent of the prunes by weight may show insect injury or damage by means other than those mentioned in the text.

PROVIDED that the total of all defects mentioned in paragraphs (a) to (h) inclusive shall not exceed 15 per cent, but the total of defects mentioned in paragraphs lettered (c), (e), (f), (g), and (h) shall not exceed 3 per cent.

»» ***U. S. GRADE C or U. S. Standard*** shall consist of dried prunes which meet the following requirements:

(a) The color of the skins shall be black, blue black or reddish purple. Not more than 15 per cent, otherwise meeting grade requirements, may have a chocolate or "dead" lack luster color.

(b) The color of the flesh of the prunes shall be Golden Rod Yellow to Mirador Brown, as defined in Maerz & Paul "Dictionary of Color."

(c) Not more than 3 per cent of the prunes by weight may have flesh which is fibrous or woody, including not more than 2 per cent which will float in a salt (NaCl) solution of 1.10 specific gravity.

(d) Not more than 5 per cent of the prunes, by weight, may have broken skins aggregating more than 3/8 inch in length, provided that not more than 3/5 of this amount or 3 per cent of the prunes by weight may have splits opened to the pit.

(e) Not more than 3 per cent of the prunes by weight may have tough thick scab, or scab of other character exceeding the area of a circle ½ inch in diameter.

(f) Not more than 2 per cent of the prunes, by weight, may show sunburn which noticeably changes the character of the skin or flesh.

(g) Not more than 2 per cent of the prunes by weight may be "slabs."

(h) Not more than 2 per cent of the prunes by weight may show insect injury or damage by means other than those mentioned in the text.

PROVIDED that the total of all defects mentioned in paragraphs (a) to (h) inclusive shall not exceed 15 per cent, but the total of defects mentioned in paragraphs lettered (c), (e), (f), (g), and (h) shall not exceed 3 per cent.

»» ***U. S. GRADE SUBSTANDARD*** are wholesome, edible prunes which fail to meet the above requirements.

EXPLANATION OF TERMS

20/30, 30/40, etc., means that the count of prunes to the pound ranges from 20 to 30, 30 to 40, etc., and that the count per pound does not exceed 30 or 40 respectively.

"Slabs" means prunes that have been mashed so as to break the skin and expose the flesh. Prunes mashed or broken in the process of proper packing shall not be considered "slabs."

"Insect injury or damaged by other means" means any injury or defect not mentioned above which materially affects the appearance but not the edible or shipping quality of the prunes.

"Tough thick scab" means thick leathery areas on the skin frequently formed as the result of thrip injury, limb rubs, leaf chafing or other means. Such scab is to be distinguished from inconsequential scab which assumes the color of the prune, and which is not to be considered as a defect, unless exceeding the area of a circle ½ inch in diameter.

"Sugaring" refers to the accumulation of fruit sugars crystallizing on surface of prunes.

Approved:
C. W. KITCHEN
Chief

Approved:
W. G. MEAL
In charge
Fruit & Vegetable Division

Demountable Milk Tank

To Cut Borden Costs 16 Per Cent

Brought from country receiving plants on flat cars, tanks are transferred to trailers and carried to city pasteurizing plants

SAVINGS amounting to 16 per cent in the cost of handling bulk milk from railroad yard to city pasteurizing plant are anticipated by the Borden's Farm Products Division of Borden Co., New York. This cost cutting is to be achieved through the lease of six railroad flat cars and twelve 3,000-gal. demountable tanks from Motor Terminals, Inc., New York, for handling only a portion of the Borden incoming bulk milk supply. And what is more important, this saving may be increased three or four times—to from 48 to 64 per cent—when the entire bulk milk supply is handled by the demountable-tank method, provided, of course, that the anticipated savings of the first trial installation are secured in actual operation.

The above-mentioned equipment has been leased by Borden for a period of 7½ years. It is now under construction and is expected to go into service in January, 1940. If the anticipated savings are secured, and this seems most likely since the savings were calculated very conservatively by the user of the equipment, its introduction may revolutionize the handling of bulk milk shipments coming into cities by railroad. Furthermore, the success of the new method for bulk milk may point the way to similar economies in handling other fluids in the food field, such as liquid sugar, condensed milk, glucose and molasses.

Another factor very important to the food plant is that little, if any, capital investment is required. Motor Terminals, Inc., leases its equipment on a per day basis. This equipment consists of railroad flat cars, demountable tanks and the loading and unloading mechanism. The latter goes on the motor truck or trailer used to move the tanks from the railroad yard to the city plant. Further, the gross rentals accumulated on the per day basis are reduced by Motor Terminals, Inc., which credits to this account the wheelage charge paid to it by the railroad for running the equipment over its lines. For bulk milk into New York City, this amounts to 2½ cents per mile for both empty and loaded mileage. In some cases, the net rental charges may be reduced to zero, as when the accumulated wheelage credits equal the rental charges. However, in no case can the credited wheelage exceed the rental charge to form a refund, which would be in the nature of a rebate and therefore illegal.

Rear view of the demountable milk tank, showing end vestibule enclosing fill-line and discharge pipes and valves, milk agitator and its motor, thermometer, peep-hole, cleaning manhole and light peep hole.

While the Borden demountable tanks are new, since they are now in the course of construction, the Motor Terminals, Inc., principle, as developed by President Benjamin F. Fitch, has undergone 20 years of experimentation. It began with the inter-terminal transfer of freight at Cincinnati, Ohio. And demountable milk tanks have been in use for over 3 years by Hohneker's Dairy, Inc., North Bergen, N. J., as described in FOOD INDUSTRIES, March, 1936.

The Hohneker tanks, however, are of 2,000-gal. capacity and are loaded transversely on the railroad flat car. The Borden tanks are of 3,000-gal. capacity and are loaded longitudinally on the railroad flat car, two to the car.

With the tanks loaded transversely, the truck or tractor-trailer must back up to the car. With the tanks loaded longitudinally, the motor equipment pulls up alongside the car. At Borden receiving points, the relatively narrow roadways between the tracks at usual team tracks makes it impossible or difficult to load a long semi-trailer endwise without time-consuming maneuvering. So the sideways transfer of the tank from car to trailer eliminates such time losses, with the time of actual tank transfer remaining the same under both methods.

The tank size and car loading can be varied to suit the liquid carried and the delivery conditions existing. With a 50-ft. flat car, these vary from five 1,500- to 2,000-gal. tanks placed transversely (with a total tank capacity of from 7,500 to 10,000 gal.) to two 3,000- to 4,000-gal. lengthwise tanks (a total capacity of from 6,000 to 8,000 gal.).

The tanks are constructed to the user's specifications. In the case of the Borden company, they are made of stainless steel with 3 in. of insulation and are fitted with an end vestibule. This vestibule accommodates fill-line and discharge pipes, valves, agitator and motor, thermometer, peep

hole, cleaning manhole and light peep hole.

The tanks and the flat cars on which they are carried are leased by Motor Terminals, Inc., for 5- or 7½-year periods. The per day lease charge depends upon the specifications of the tanks and the term of the lease. For example, for the 7½-year period the daily lease charge for a 3,000-gal. tank may be $3 and that for a 50-ft. flat car, $1.35. Thus, for four such tanks and two flat cars, the lease charge would be $14.70 per day. For a year, the charge would be $5,365.50. Suppose the two flat cars traveled over the rails, both empty and loaded, for 214,620 miles in the year. Then the wheelage paid by the railroad to Motor Terminals, Inc., at 2½ cents a mile and credited to the user would equal the lease charges of $5,365.50, so that the user's lease charges would be nothing.

In addition to the flat cars and tanks, a loading and unloading mechanism is required on the truck or trailer used to carry the tanks to the final destination. This is also furnished by Motor Terminals, Inc., and costs from $1,500 to $1,700, installed, per tractor and semi-trailer. Or it may be leased on a 7½-year contract at $1.50 per day ($1 for the trailer portion of the equipment and $0.50 for that on the tractor).

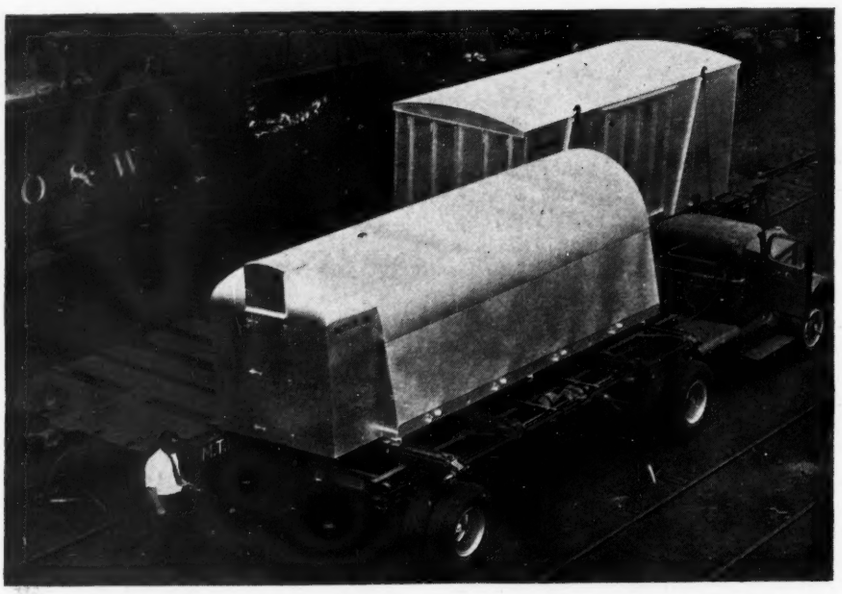
But to get back to Borden, the six flat cars and twelve 3,000-gal. demountable tanks are to be used to haul milk in full 3,000-gal. units over the Lehigh Valley railroad from Newark Valley, Owego and Dryden, all in New York State, to the yards in Jersey City, N. J. These three points of origin are, respectively, 291, 281 and 313 miles from Jersey City.

At Jersey City, the full tanks will be transferred from the rail cars to a semi-trailer and hauled by tractor to the company's Brooklyn pasteurizing plant. The trailer is a conventional unit equipped with the loading and unloading mechanism. At the pasteurizing plant the tank will be transferred to a convenient platform preparatory to its contents being pumped into the existing milk storage tanks. This leaves the trailer free to load an empty tank and move it back to the Jersey City yard for shipment by rail back to the country.

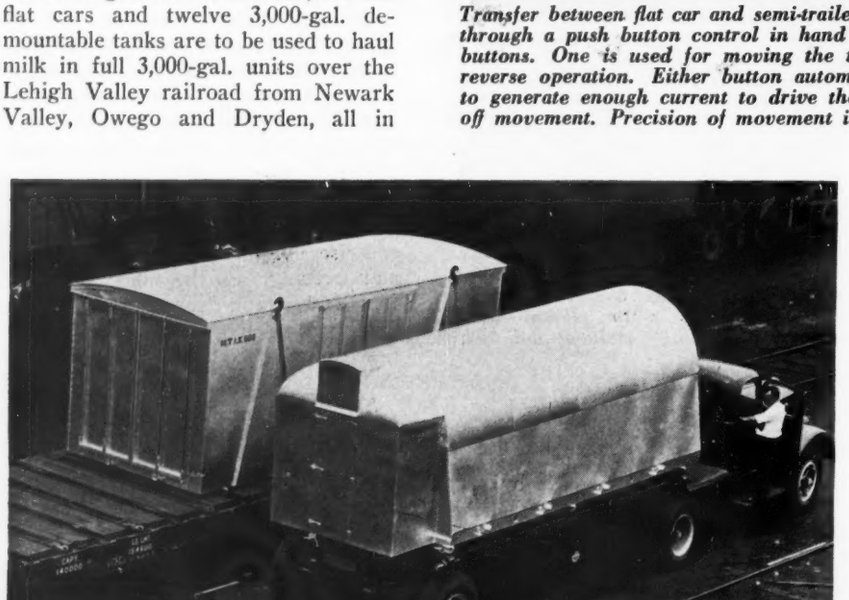
Another variation of the above procedure is possible with more than one Motor Terminals, Inc., equipped semi-trailer. That is for the tractor to back the loaded tank trailer into its position in the unloading bay or at some other point, disconnect and hook up to an empty tank and trailer going back to the Jersey City yard. If the loaded tank and trailer are spotted at some point other than an unloading bay because all of these are filled, they are moved when a bay is empty. This would be done by the drill tractor in service at the plant for spotting other plant-to-retail-branch trailers.

The point is that by some means the expensive tractor, with its driver, can be kept busy continuously in shuttle work between plant and yard. Also, with a spare trailer kept at the railroad yard, the tractor returning to the yard with an empty tank can first disconnect, load the full tank off the car onto the spare trailer and then load the empty tank onto the flat car, all without unproductive mileage between plant and yard.

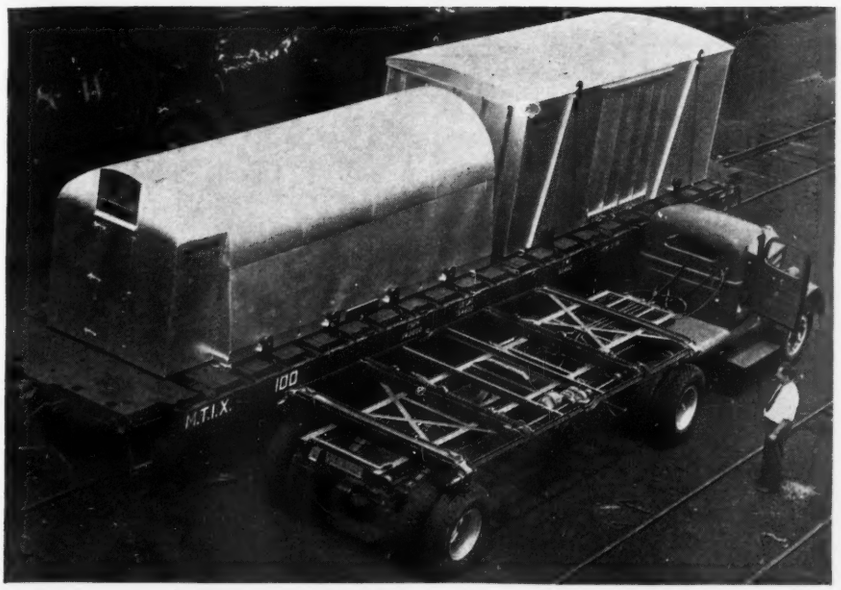
Deposited at the plant, the full tank



Transfer between flat car and semi-trailer is made electrically in less than 2 minutes through a push button control in hand of man at lower left. This control has two buttons. One is used for moving the tank from car to trailer; the other, for the reverse operation. Either button automatically speeds up the tractor engine so as to generate enough current to drive the conveyor chains which provide the on or off movement. Precision of movement is provided by the electric control.



Tank is loaded and locked in place on semi-trailer, ready to start to city pasteurizing plant. The sideways or lengthwise transfer of the tank between railroad car and tractor-trailer can be made between adjacent team tracks without the maneuvering of tractor and trailer required in endwise loading and unloading. Note the tank skid rails and safety stops on the flat car. On the trailer, the tank is carried on similar skid rails made up into a framework which can be mounted on any conventional trailer.



At left on the 50-ft. flat car is one of the 3,000-gal. Motor Terminals, Inc., insulated demountable tanks. It is similar to the twelve recently leased by the Borden's Farm Products Division of Borden Co. for handling a portion of its bulk milk coming into New York City by rail. To the right is a demountable box-type body such as may be used for handling milk in cans. In the foreground is a conventional motor tractor and semi-trailer with the special body-transfer equipment, the power for whose operation is secured from the tractor engine.

serves as an additional short time storage unit. Should additional regular storage capacity be required, facilities could be provided to transfer the tank to the main storage floor of the plant. In new plant construction, provisions could be made to have the demountable tanks replace the conventional fixed storage tanks.

At the present time, the milk which the demountable tanks will carry is being shipped in fixed-tank railroad cars. Borden owns 50 of these cars, 47 being of 6,000-gal. and three of 7,640-gal. capacity. In addition, the company leases seven 6,000-gal. cars. Arriving at Jersey City yard, these tank cars are unloaded into Borden fixed-tank semi-trailers. The company operates eight 3,140-gal., two 2,670-gal. and two 2,720-gal. units.

With the freight rate paid to the railroad remaining the same with both fixed and demountable tanks, the anticipated Borden savings result from economies in the operations from the time the milk reaches the rail yard until it is delivered to the plant. Under the present fixed-tank car operations, men are employed at the Jersey City and three other railroad platforms for handling tank car and canned milk shipments. The duties of these men include checking the amounts of milk received, pumping the milk from the railroad car tank into the local trailer tanks, dispatching the latter to the city pasteurizing plant and rinsing the railroad car tank preparatory to its return to the point of origin. In addition to the above platform men, other men work out of the Borden tank car shop in Jersey City. The duties of these men include tank car inspection at all four rail platforms and making minor repairs to cars, tanks and tank truck valves and fittings.

With the use of demountable tanks, the tanks of the present motorized transfer fleet can be discarded. And in addition, immediate economies to the extent of 16 per cent of the present costs will be effected by the partial adoption of the demountable-tank system. These economies are made up as follows:

1. Elimination of some platform labor.

2. Elimination of agitation of the milk and the rinsing of tanks at the railroad yard, for which a charge of $0.50 per tank car per day is made by the railroad for electricity and water.

3. Elimination of the pumping of milk between car tank and trailer tank at the railroad yard and two consequent sources of milk waste, neither of which is included in the 16 per cent savings. One of these sources of waste is the sticking of milk to the surface of the empty car tank. The other is loss of milk in the transfer from car tank to trailer tank due to the inherent nature of the unloading and rinsing operation. This loss includes residue in the tank and connecting pipes, leakage at fittings and so forth.

4. Reduction in motor vehicle transfer expense between yard and plant. This results from the ability to move more loads per man by reason of the larger tank volume shipped and time saved at the yards. Then there is a reduction in the number of uneconomical, part capacity, remaining piece loads. These arise from the shipment, due to supply and demand, of less than the full capacity of 6,000 to 7,640 gal. in the car tanks and subsequent division into smaller trailer tanks of 2,670- and 3,140-gal. capacity.

5. Inspection and repairs of the demountable tanks by city plant employees at less expense than in the railroad yard.

6. Elimination of part of the expense of washing the existing trailer tanks at city plants. The demountable tanks need only be rinsed, the same as fixed car tanks, washing being done at the point of origin before loading.

As the demountable-tank method is extended to include all incoming bulk shipments by rail, additional savings amounting to three or four times the initial savings are anticipated. These include the elimination of the entire yard platform crew, the elimination of the expense of the tank car inspectors traveling from yard to yard and the reduced expense of such inspection and repairs when done by plant employees. Another saving of temporary duration is the reduced maintenance expense of the new demountable tanks as compared with that of the present fixed car tanks.

The entire elimination of the Borden yard crew, even with shipments of canned milk being continued, can be made effective by the use of a rectangular box-like, insulated demountable body now being constructed by Motor Terminals, Inc. This body is 24 ft. long, is insulated with 4 in. of cork and will carry 250 cans of 10 gal. each, or 2,500 gal. in all. Two such bodies or one tank and one box body can be mounted on each rail car, and the box bodies can be moved both ways between yard and plant by the same trailer equipment that moves the demountable tanks.

Aside from the above Borden installation, Muller Dairies, Inc., New York, has also leased two flat cars and two 4,000-gal. tanks, to be used one tank to the car, from Motor Terminals, Inc. The latter company also has negotiations under way with Sheffield Farms Co., Inc., New York, for the use of demountable tank equipment.

Improved Sweetening Agent Developed from Corn Starch

Being used or tested in several food products

SOMETHING new in the way of a sweetening ingredient has been developed for use by food manufacturers. It is a new corn sirup, twice as sweet as regular corn sirup, one-third as viscous, and it will not crystallize. Because of its particular characteristics and its relatively low cost, the new product is either already in commercial use or is being tried out experimentally in several food industries. These industries include those making confectionery, condensed milk, jams, jellies and preserves, canned foods, bakery products, ice cream, tomato catchup, wine, beer and sirups.

This new sweetening agent, "Sweetose," is the child of extensive research. For years, the laboratory of A. E. Staley Manufacturing Co., Decatur, Ill., has been trying to convert more of the starches in corn into food sugars, yet avoid bitterness, and make them sweeter and more suited to wide usage. From this research was discovered a method of carrying hydrolysis of starch beyond the stage previously practicable. And it is by carrying the hydrolysis farther that the new corn sirup is made.

Some modification of the general process of hydrolyzing starch is employed in the production of all sweetening agents from corn; namely, regular corn sirup, Sweetose and dextrose. The basic principles are the same. Normally, an aqueous suspension of starch is placed in a converter with a small amount of hydrochloric acid as a catalytic agent. The extent of the hydrolysis is principally a function of time. And if the hydrolysis is interrupted when a dextrose-equivalent analysis of 42 per cent is reached and the hydrolyzate neutralized and filtered, ordinary corn sirup is produced. If the customary conversion is carried much beyond a 50-per cent dextrose-equivalent, bitter flavors begin to appear in the hydrolyzate. As the conversion proceeds to a higher dextrose-equivalent, these bitter flavors become quite pronounced.

In making dextrose, crude corn sugar with a dextrose-equivalent of about 90 per cent is produced, this having a very bitter flavor. But by careful control of the hydrolysis and separating the hydrol or mother liquor from the sugar, crystalline dextrose is produced. And this product is free of the bitter flavors, because the mother liquor has been removed.

But in the past it has not been possible to make a starch hydrolyzate with a dextrose equivalent much over 50 to 55 per cent without the product being bitter and having a tendency to crystallize. These were the two hurdles that the Staley research workers took when they developed the new sweetening agent. They found a way to carry the hydrolysis of starch far enough to obtain a dextrose-equivalent of 65 per cent without obtaining a bitter flavor or a tendency to crystallize. The undesirable flavor is eliminated through a new method of hydrolysis. Freedom from a tendency to crystallize comes from a different balance between the sugars. That is, Sweetose has less dextrose and more other sugars, principally maltose, than would a product of the same dextrose-equivalent produced by the conventional method.

Sweetose is a clear, colorless sirup. As mentioned previously, it has twice the sweetness of regular corn sirup and approximately one-third the viscosity. Here is how its analysis compares with that of standard corn sirup:

	Sweetose	Regular corn sirup
Dextrose equivalent....	64.5	42.0
Dextrose	42.5	22.6
Maltose	23.3	9.3

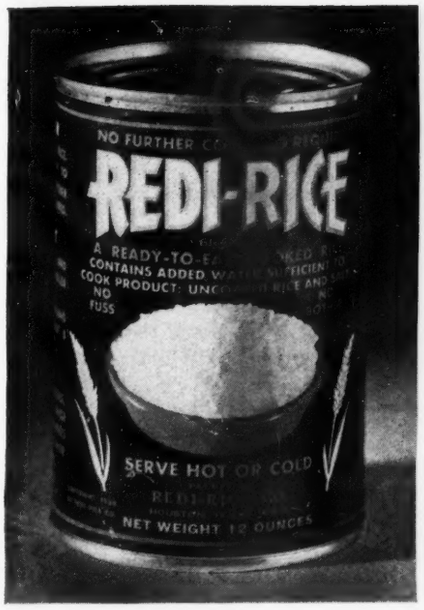
The difference between the new product and commercial corn sirup is principally in a greater amount of sugar in the former, with a corresponding reduction in the dextrine content and a balance between the sugars so as to avoid crystallization. The product is not believed by the manufacturers to contain any sugars not in commercial corn sirup.

Taking the sweetness of sucrose as 100, the relative sweetness of Sweetose is 45, as compared to 22 for ordinary corn sirup and 65 for dextrose. These values are those given by the Staley company, and are based upon tests by its own staff and others. Taste, of course, is the only meter of relative sweetness, and this involves a personal factor.

Confectioners were the first to utilize the new corn sirup, and Staley reports that a number of prominent candy makers are putting it into their products. In the manufacture of sweetened condensed milk, ice cream, bakery products, jams, jellies and preserves, canned fruits, tomato catchup, and table sirups, not only experimental work but plant operations have proved the value of the new sweetening agent, it is claimed. The fact that it does not crystallize is in its favor, as an ingredient in jams, jellies, preserves, ice cream, fountain sirup and wine. In tomato catchup, improved color, body and viscosity, with economy in costs, are said to result. In the manufacture of condensed milk, control of crystal size and costs are reputed to be aided by the use of the product. In beer and ale, it is supposed to act as a smoothening agent. In bakery tests, both in the laboratory and the plant, improved crust color, crumb texture and moisture retention, together with economy, are credited to the use of Sweetose. That use of the sirup in fruit products enhances the flavor is another claim made for it.

Staley's
WAFFLE
SYRUP
A BLEND OF CORN SYRUP, GRANULATED SUGAR SYRUP AND IMITATION MAPLE FLAVOR
A. E. STALEY MANUFACTURING CO., DECATUR, ILLINOIS

Table sirup is one type of food in which Sweetose is used as an ingredient.



New Packages & Products

Rice Ready to Serve

The relatively short span between our pioneer forefathers and our present generation has seen the rise of America's greatest industry, the food industry. The pioneer secured and prepared all his own food. The food processor's mission has been and still is to procure, prepare and preserve foods ready for the pan and even for the table.

Today's processors travel along one of three avenues. Vast expansion opportunities lie along each route. Food processors originate new foods, prepare and preserve foods normally bought raw and unprepared, or prepare ready-for-serving dishes formerly concocted in the kitchen.

Rice, the basis of many a familiar American dish, is normally purchased as uncooked grain and prepared by the housewife for the table. Preparing rice for table use requires moderate culinary skill. Now rice is prepared for the housewife ready to serve and more uniform in texture than kitchen efforts produce. "Redi-Rice", product of Redi-Rice Co., Houston, Tex., is cooked rice ready to serve without further cooking. Rusio Products, Philadelphia, markets rice puddings, "Syons Rice Pudding with Shredded Coconut" and "Syons Rice Pudding with Raisins," both ready to serve from the can.

Packaged Soup Vegetables

Struggle for markets between manufactured foods and raw unprepared foods has been a death struggle, with odds in favor of manufactured foods. Year by year the volume of the one has increased at the expense of the other. However, raw foods do not surrender easily. Food Industries has frequently pointed out the improvements in product and package which have aided raw foods to regain vanishing markets. (See Food Industries, Dec. 1938, p. 714). A new product, "Supreme Fresh Diced Vegetables," packaged by Supreme Packing Co., New York City, bids for an increased share of the soup and stew markets. Shelled, diced and cut vegetables are packaged, 10 oz. in a transparent cellulose bag closed with paper coated metal clip. The housewife need not purchase unnecessary amounts of fresh vegetables for soup or stew, the one package contains a variety for the kettle.

Food DISTRIBUTION

Hints and Hurdles

Higher Education's Justification

THE ADVENT OF VITAMINS left us mystified. The enlargement of the vitamin family to accommodate subscript identifications, such as B_1 and B_2, left us confused. Now we learn vitamin P (citron) is soon to be introduced. No doubt, as in the atomic table, spaces are left for the unknowns which will fill the gaps up to and no doubt beyond vitamin P. At last we begin to appreciate the need for higher education of the masses.

Fleet Owners Fight Barrier Laws

LAST MONTH the National Council of Private Motor Truck Owners met in New York City. The membership list reads like a Blue Book of the food industries. Dairymen, bakers, brewers, meat packers met to solve common problems. These problems were only those of protecting private truck fleet owners from the handicaps placed on them by state trade barrier laws regulating trucking.

It is noteworthy to observe united action by a group of industries manufacturing different foods. It is also gratifying to learn of united action against state trade barrier laws. The association's objectives are worthy of the support of those in the food industries who operate their own fleets of trucks.

Red, Pink and Lily White

AT THE OCTOBER MEETING of the Associated Grocery Manufacturers of America, representative Martin Dies intimated the probability that his committee to investigate un-American activities might pass a fine-toothed comb over the consumer movement, particularly that branch headed by the research organizations. Evidence that Dies will make good his scrutiny of consumer groups has materialized, according to a report by J. B. Matthews, research director of the House committee to investigate un-American activities. Mr. Matthews' report points out the method used by communists in forming consumer organizations or in obtaining control over them by placing their own members in control, thereby dominating consumer groups to their own purposes. As a part of his report, Matthews lists many consumers' groups reported to be under the influence of communists. Consumers Union is on this blacklist. No mention was made, however, of Consumers Research.

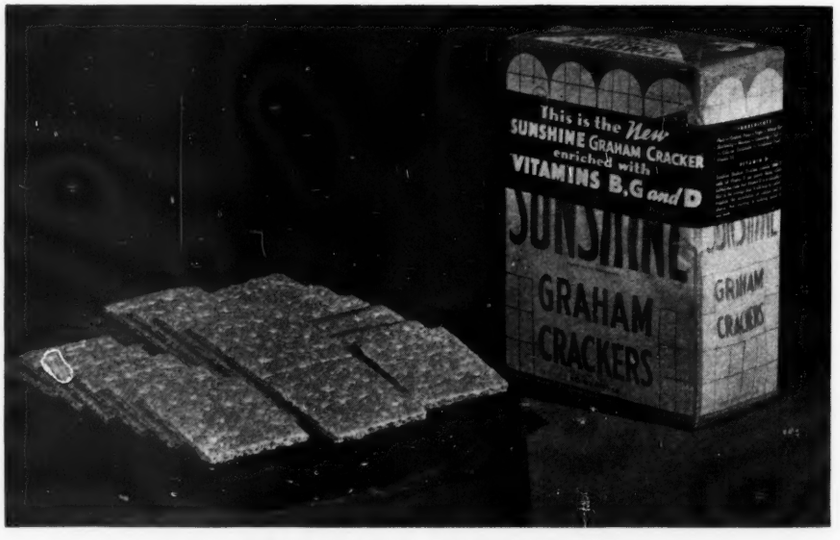
Now, we have always thought of Consumers Research and Consumers Union as twins—much alike, though maintaining separate identities. Of course, when it comes to trivial technicalities, we bog down—maybe we are wrong. However, when Consumers Union split off from Consumers Research, the strikers in a meeting on Sept. 12, 1935, ardently voiced their loyalty to the principles upon which the organization was founded. (FOOD INDUSTRIES, October, 1935, p. 516.)

At the time of the split-up, J. B. Matthews was a brass hat of Consumers Research, the same Matthews who testified before the Dies Committee that he had been a member of the communist party. He is now avowed to be one of the many ex-Stalinists. This situation gives rise to ponderables. While he was a brass hat with Consumers Research was Matthews red, pink or lily white? Did Consumers Research drive him red or did he fade to pink or lily white when he left? All this doesn't make sense, but then when it comes to technical trivialities or trivial technicalities, we bog down.

Just Who Is Mrs. Consumer?

A BULLETIN on informative labeling has recently been released by a group of Washington bureaus operating in conjunction. The bulletin reports the results of a survey of manufacturers, retailers and consumers to determine what information should be placed on labels and fabrics and a few selected household utensils.

The schedules for consumers were mailed to "Representative members of each of several organizations, including the American Association of Uni-



$100,000,000 MARKET FOR THE TAKING

The trend among food manufacturers to stress vitamin content on labels and in advertisements, as well as vitamin fortification of food products, is more than a fad and a fancy to capture the intense public interest in vitamins. Last year, approximately $100,000,000 went to the drug stores for vitamin preparations. This $100,000,000 worth of vitamins was prepared from foods. Except in rare cases an adequate diet of food supplies the individual with all the vitamins necessary to normal health and growth. Food manufacturers rightly contend that the bulk of the vitamin market belongs to them. They are out to recover it. Loose-Wiles Biscuit Co., New York, has recently introduced a new Sunshine graham cracker enriched with vitamins B, G and D. The new cracker also provides a source for minerals. They contain added iron and balanced calcium and phosphorous.

versity Women, the American Home Economics Association," etc.

Even among members of these intellectual groups, according to some of the results, there is admitted lack of understanding of the minimum number of technical expressions used in the schedules, and an admission that many of these among our best educated did not know and honestly admitted incompetency to judge.

The results of the survey based on returns from such groups of women represent what the educated minority of American women think is best for all American women of whatever degree of education and regardless of income status.

Foods, fortunately, were not included in this study. If the study is made on what consumers want on food labels, let us hope it is based on a correct statistical cross section of consumers and not a minority's opinion of what is good for the majority.

"Ham-and-Eggs" and "Consumers"

THE THINKING PEOPLE of the whole country, as well as those of California and Ohio, have rebelled at the thought of "ham-and-eggs" and the Bigelow pension bill, two legislative proposals which minority recipients attempted to thrust down the throat of the whole people.

Until the California and Ohio bills were defeated, the nation trembled, not only at the thought of the effect of this legislation in the respective states, but for fear that if these bills passed, self-seeking minorities might "legally" obtain a greater control over the whole country.

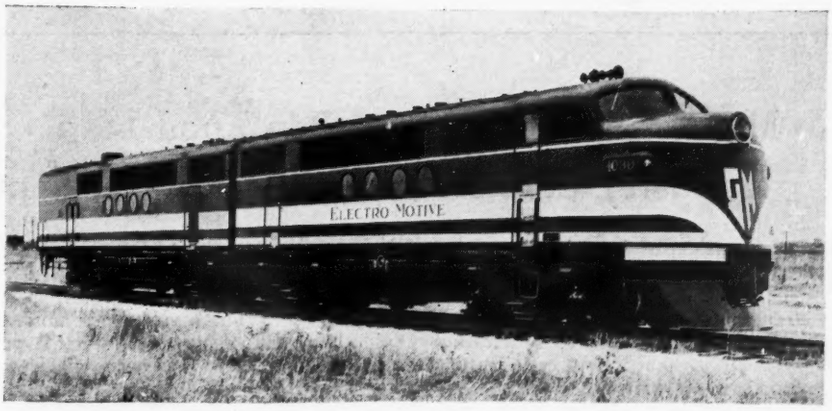
The activities of the present "consumer groups" to force upon the statute books their conception of proper legislation, both national and state, are little different from the activities of the "ham-and-eggs" group in California and the Bigelow pension bill group in Ohio.

The fact that "consumer groups" representatives are composed of top flight intellectuals — educators and university graduates—does not quite qualify them to underwrite the legislation requirements of the whole people, any more than membership in the "Oldster" minority group in California and Ohio qualifies them. The fact that a fair portion of the membership of the "consumer groups" would welcome an overthrow of the existing order and the establishment of a socialistic state is beside the issue. "Consumer groups" and "ham-and-eggs" are at present on a par when it comes to minority groups representing a whole.

Food DISTRIBUTION

Try It on Pickled Pigs Feet

IN JUNE, 1938, FOOD INDUSTRIES reported on the new product of Hormel Co., Austin, Minn., "Spam," a meat product whose ancester was plain ham. Now comes the announcement of another new product placed on the market during January, packed for Clover Farm Stores Corp., Cleveland, Ohio. This new product is "Spork," whose family tree reaches far back into antiquity when the family name was plain pork. We are looking forward with unbounded enthusiasm toward more new names for ancient families, "Sbeef," "Smutton," "Slamb," "Scalf," "Sliver," "Sprains," and "Skish." Try your hand at originating a new name for that ancient family "pickled pigs feet."



A new diesel electric locomotive designed for fast through freight service has been under test during the last month. The new locomotive clipped 2½ hours from the schedule of a regular steam locomotive running over a distance of 278 miles. The new locomotive hauls a train of 40 cars weighing 2,000 tons at 55 miles per hour over level track. If and when this new type locomotive is in general use on fast freight service, it may solve at least some of the problems the frozen food industries face in transporting quick-frozen foods over long distances.

"Spork", a new all pork meat product of Cleveland's Clover Farms Stores Corporation.

New Outlet for Foods

GENERAL STORES, though too often neglected by food manufacturers, have always been volume outlets for foods. Food sales of department stores during 1939 were approximately $100,000,000. Variety stores distribute more than $100,000,000 worth of foods to consumers each year. The drug store, as has been repeatedly pointed out in FOOD INDUSTRIES, is an increasingly important food outlet with food sales of over $300,000,000 annually.

Only one large potential group of outlets has remained reticently aloof from the distribution of foods. This group is the mail order house group. And now one of them devotes a page of advertising in color in its year end sales catalog, just mailed to 4,000,000 midwesterners, to building up the sales of a food. Sears, Roebuck & Co. features in this catalog Rio Grande Valley tree-ripened grapefruit. Orders received will be billed and shipped direct from Texas growers. The advertisement recently mailed suggests that a bushel or more tree-ripened grapefruit be added to time-payment orders. Mail order food on a time payment plan is "something new under the sun."

The Food Industry News

Paper Milk Container Claimed To Be Success

Favorable acceptance of the two-quart paper milk container in Brooklyn, N. Y., is indicated by statements issued by Borden Co. and Sheffield Farms Co., Inc., in reply to a consumer acceptance survey reported by Steve Hannagan, New York. "The results of the survey are at wide variance with the Borden customer acceptance as we have so far experienced it," said W. H. Marcussen, president of the Borden's Farm Products Division of the Borden Co. "In the areas now served with the new two-quart Econo-Way package, 50 per cent of the volume on our retail routes is already being distributed in the new container. On some routes our consumer acceptance has been as high as 90 per cent of the route load. This is a decidedly more favorable consumer acceptance than indicated in the report, which alleges that only 32 per cent of the consumers favor the package.

"The publicity release is dated Dec. 20. Obviously, the time required for the survey work and the compilation and analysis of the results means that the survey must have been begun as early as Dec. 1. At that time certain areas covered by the survey had been served with the new container for a period of less than a week, and in other areas . . . the new container was not even introduced until Dec. 4. . . . Clearly, the survey was made so soon after the initial introduction of the package in many of the areas covered that it was impossible to have obtained a true picture of consumer acceptance."

A spokesman for Sheffield Farms said: "The two-quart container is only a month old. In view of the brief time which it has been offered to the public, statements such as those put forward by Mr. Hannagan seem premature. Certainly the conditions pictured in the statement do not fit Sheffield's experience to date."

The survey reported by Mr. Hannagan was made by Market Research Corp. of America. According to it: "Of the 4,087 women interviewed in person, 2,710—two-thirds of all those questioned—had been offered the milk deliveries under the two-quart paper container system. Of these, it was revealed, only 839, less than one out of every three, were availing themselves of it. And, even in the group of acceptors, the survey showed that 35 per cent would still prefer to get their milk in glass bottles. A total of 1,871 women—69 per cent had not accepted the plan."

FOOD "CANNED" IN PLIOFILM BAG

All foods packed in tin or glass can be put up in this "Naturalpak" container, claims Bensel Brice Corp., Hollywood, Calif., which developed it. The blanched vegetables are placed in a Pliofilm bag and heat-sealed. Then the bag is placed in "cooking chambers", sealed water and vapor tight, and put into standard retorts for 25 to 90 minutes. After retorting, the containers are pressure cooled in the cooking chambers, then removed and placed in a printed folding box. The box is tight-wrapped in Cellophane and put into shipping containers. The cost of the package complete is said by Bensel Brice to be 50 per cent under that of tin cans. Saving in shipping container costs is also claimed because of their reduced size; 742 sq. in. of corrugated board is required as compared to 1,087 sq. in. for a carton for 24 cans. The alleged saving in shipping weight amounts to 20 per cent; the space saving, 30 per cent. It is further said that more than 1,000,000 Naturalpak containers could be stored in the space required for 2,000 cans. The sponsor says the package will be seen shortly on the market, but the companies using it have not been named.

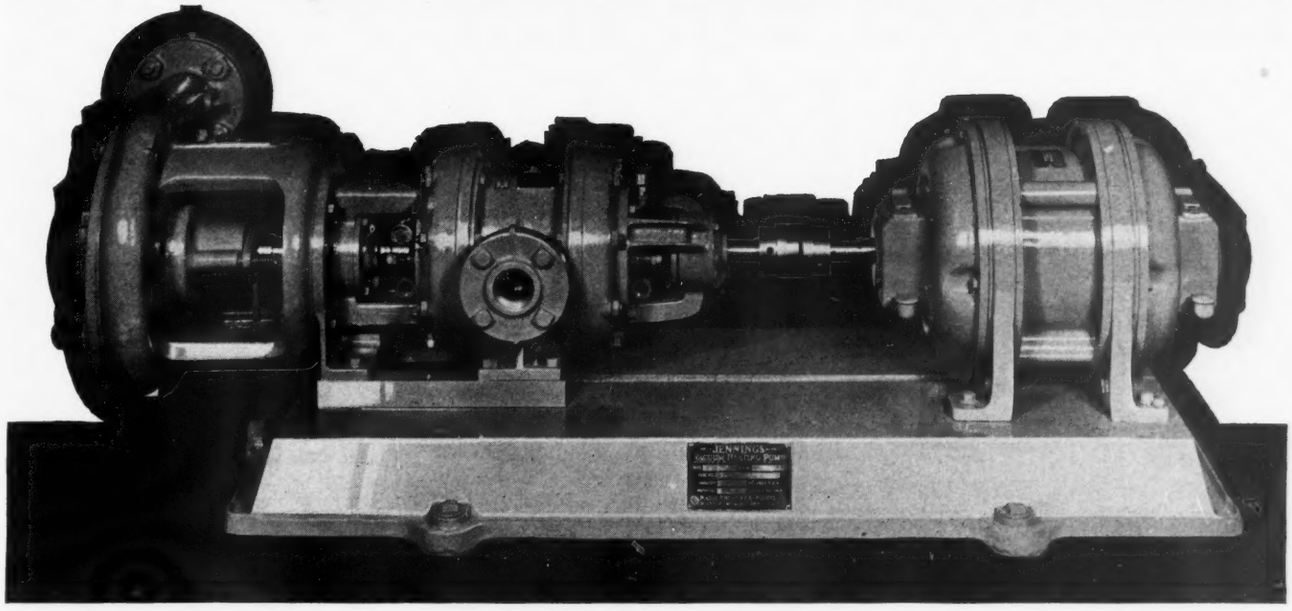
No Major Changes Expected in Food Law; Industry Cooperating in Its Enforcement

Much nonsense has been printed about the effect of food law label provisions after January 1. The charges include all kinds of statements as to how the Food & Drug Administration has yielded to political pressure, how the food law is going to be repealed or radically amended, how there is no possibility of effective enforcement until after July 1. Most of this has been fabricated from little or no evidence and all of the conclusions drawn seem wrong.

Some state bottlers' groups thought that their Congressmen ought to help them out with the Food & Drug Administration. As a result, there were reports that Congress was going to take a hand. This story grew until it said that the law was going to be repealed. The facts are quite different. The original request of American Bottlers of Carbonated Beverages for a permanent exemption from label declaration of ingredients did not appear persuasive to F&DA. The leaders of the industry themselves appreciated this. They sensibly changed their plan of procedure.

The convention resolution of ABCB

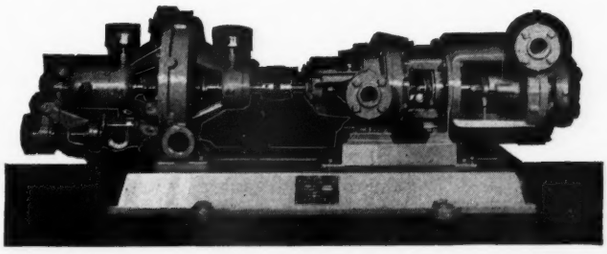
Nash—the Perfected Vacuum Pump for Evaporators and Condensers



COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.

NASH ENGINEERING COMPANY

SOUTH NORWALK · CONNECTICUT, U. S. A.

on this subject was a constructive cooperative announcement of policy. On the basis of it, the Association asked for a temporary exemption from label declarations pending the fixing of definitions and standards. This request was granted. There was no unusual political pressure and none was needed. F&DA acted straightforwardly and willingly on the basis of its own judgment.

Another Washington story is that the Lea amendment "carries a joker which actually provides a blanket extension to July 1 for all foods, drugs and cosmetics." F&DA is charged with accepting this conclusion, but it denies this categorically. The truth appears to be simple. Certain costly containers and labeling are to be permitted during the six months to come. FOOD INDUSTRIES last month described the official regulations of F&DA that prescribe for the handling of these cases. These in final form have since been printed in the *Federal Register* of Dec 5. There is no breakdown of the law, no big leak, and nothing that has not been adequately considered by those carefully following the Washington situation.

Still another story, much resented by the preservers, is the charge that an organized effort is being made to secure radical change or repeal of the law. National Preservers Association has been categorically charged with such a revolt. Documentary facts from Association headquarters clearly demonstrate the fallacy of that charge. The Association intends to stand on its legal rights, as all would expect. But it categorically repeats its intention, first to cooperate fully with the Department in a reasonable application of the law, and second to go to court to secure its rights if such unfortunate method should be necessary to secure judicial rulings on controversial points. This Association, as well as ABCB, is definitely on record as supporting the law and intending to work under the law sincerely.

Salad Dressing Makers Ask Label Exemption

Appeals from 32 independent manufacturers of salad dressing asking temporary relief from the label requirements of the Food, Drug and Cosmetic Act, were heard before a new type of advisory board, named by Secretary Wallace, on Dec. 15. This was the first time hearings in public have been held on a petition of this nature, although several appeals of a similar character have been discussed behind closed doors in the past.

It was explained by several of the spokesmen for the group, which it was said represented from 25 to 35 per cent of the manufacturers of this commodity, that they really wished the establishment of a standard for their commodity with as little delay as possible. Pending such action, they urged the Department to act under Sec. 902 (a) (2) and authorize temporary exemptions to the labeling requirements.

The chief complaint presented to the hearing board was that the requirements as provided by the existing law are impractical, and would, if enforced, impose an almost impossible burden on the makers of this commodity.

If they are compelled to have different label sets for each different ingredient and for each shift in the percentage of each ingredient, the total number of labels they would be compelled to stock would mount into the hundreds of thousands.

Final Regulations Issued On Label Postponement

Postponement of the effective date of certain of the labeling provisions of the Federal Food, Drug and Cosmetic Act to July 1, 1940, was announced on Dec. 5 by the Food & Drug Administration. The postponement applies to stocks of lithographed labeling manufactured prior to Feb. 1, 1939, and stocks of containers bearing labeling which was lithographed, etched, stamped, pressed, printed, fused or blown on or in such containers. This action by F&DA answers a question in the minds of many food manufacturers—what to do with printed labels which are not attached to containers but which fulfill the other requirements for exemptions under the Act and the regulations based on the Act.

These final regulations depart from the tentative regulations by eliminating the provision that each unit of labeling

CAPITAL VIEWS

BREAD PRICES—The Federal Trade Commission intends to find out whether a large baking company can fix different prices for bread in different communities where the effect of a low price in certain small towns may be to restrain competition of small local firms. This action under the Robinson-Patman law, when finally adjudicated, is likely to fix the limitation which the government may impose on the price schedules for different classes of customers of a single company when the customers themselves are not competitive one with another. Apparently it requires a combination of Robinson-Patman authority and antitrust authority to reach this sort of situation.

MILK TRUST INQUIRY—The Supreme Court says that the agricultural marketing agreement law has not superseded the antitrust laws. Therefore, the Department of Justice may proceed to try a large group of milk and milk products interests in the Chicago courts under the indictments charging them with monopolistic practices.

TAX PLANS—The fixing of a tax policy is one of the most important questions to be faced by Congress. A variety of plans has been studied. Some action is imperative. There is little hope of keeping the deficit for next year low enough to permit borrowing within the legal limit of $45 billion; and Congress is just about as willing to pass a new tax law as it is to raise this limit of Federal debt. The gesture of the President in favor of a special defense tax has not been well received in Washington and is not expected to prevail. But some new levies on business and personal incomes seem likely.

PRICE CRITICS—Washington has a terrible time understanding how TNEC can expect successfully to watch and influence prices (as requested by the President) when Assistant Attorney General Arnold announces that the antitrust laws tend to raise prices. Mr. Arnold did not really say just that, but he was so understood. What he wanted to complain of was the difficulty of doing anything by law which would either limit profiteering or make the trust laws into price regulatory measures. However the food industries take these interpretations, they can expect a crack-down to be made, probably by TNEC, Federal Trade, or Justice, whenever there are any unexplained price rises.

TRAIN LOAD RATES—Precedent making action was taken by the Interstate Commerce Commission when it approved a train load rate for molasses from Louisiana to Illinois. The purpose was to let the railroads get some of this business, previously almost monopolized by water carriers. But the same principle ought to apply to numerous foods or food raw materials which move in large quantity and could be scheduled for shipment with a train load on a single bill of lading.

CAN SIZES—Very general acceptance of the proposed standard sizes for cans is being given by the industry. Most of the 1940 pack ought to meet the recommended can standards promulgated jointly by the Bureau of Standards and National Canners Association last summer. Well over 90 per cent of the pack will be affected if the acceptance is as general as seems likely.

Genealogy

In order to make it a matter of annual record, this statement is published every January:

FOOD INDUSTRIES was founded in 1928 by McGraw-Hill Publishing Co. Dr. H. C. Parmelee was its first editor. Dr. L. V. Burton succeeded him and is its present editor. Associated with him are: E. S. Stateler, associate editor (now located in the Chicago office); G. L. Montgomery, managing editor; F. K. Lawler, assistant editor; Ivan C. Miller, distribution editor; R. S. McBride, editorial representative in Washington; and Earle Mauldin editorial representative in Atlanta, Ga.

stock be identical with all other units. A second change provides that exemption be given to anyone having on hand at least 10 per cent of the total stock of labels or containers used during 1939. The tentative requirement specified that there be on hand a three months' supply. The third change makes it possible for a successor of a manufacturer to use up old labels, whereas the original provision required that only the individual for whom the labels were made could claim exemption.

The labeling requirements affected by the final postponement regulations include the following provisions of Sec. 403: (e) (1); (g); (h); (i); (j); and (k). All details of the regulations were published in the *Federal Register.*

In enforcing the new food law, the Administration will not proceed first against what it considers minor infractions of the law but will devote its principal efforts to the more important violations—matters which it feels involve various types of economic cheats, frauds, adulterations and grossly false or misleading **statements.**

Proposed Canned Pea Standards Published

Hints of a first class battle followed publication by John McDill Fox, presiding officer of the canned pea hearings, of his findings of fact and proposed standards of quality and fill of container, Nov. 25, in the *Federal Register.* The legal storm may break if Secretary Wallace approves the presiding officer's findings that the mealiness of peas may be tested by the alcohol-insoluble solids test as proposed by the F&DA experts at the hearing.

One faction of the pea canning industry took violent exception to the government proposals for using this test as a standard of the mealiness of canned peas. It presented its own expert testimony in opposition to the government contention that the test is accurate. Counsel for this segment of the industry argued the failure to adhere to the standard involved criminal penalties and indicated the possibility that the test could be questioned in court as to whether a canner's liberty could properly depend on the accuracy of that test.

In virtually all other respects the finding of Mr. Fox is considered liberal by the industry. He recommends the maximum figures for all quality factors, where the originally proposed standard recommended a maximum and minimum figure.

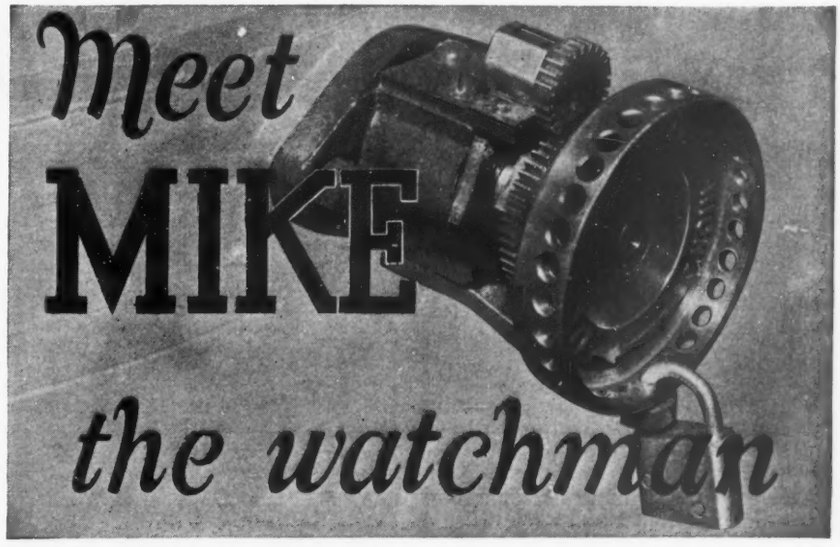
Bottlers Get Exemption

Temporary exemption from ingredients declaration on carbonated beverage labels was granted the first week in December by the Department of Agriculture. Ths permits continuance of old types of labeling in most particulars, pending the fixing of definitions and standards of identity. The industry and FDA are proceeding promptly to formulate such new specifications as a basis of permanent exemption from some parts of the labeling requirements of the law.

Canners Complimented By Food Seizure Report

A clean bill of health in so far as food poisoning is concerned is given the national canning industry in the annual report made public early in December by W. G. Campbell, chief of the Food & Drug Administration. The report covers the fiscal year 1939, and shows that, despite many added burdens the F&DA managed to maintain its enforcement activities unabated.

The McNary-Mapes seizures were reduced almost 50 per cent as compared with the preceding year. Cherry seizures made up the largest number of seizures reported. Considerable attention was paid to lead-in-maple sirup situation, and the report shows why the F&DA had denied the request of the industry to wait until maple sirup is packed for distribution before taking legal action. The report also deals at length with the spray residue problem and with improper storage. This last was blamed for most of the candy seizures on charges of contamination by filth or decomposition. Cream con-



Right now, in many of the world's greatest food plants, this micrometer adjusting wheel controlling the valve action of the Kemp Industrial Carburetor, is on watch . . . safe-guarding the highest standards known in baking, roasting, high-temperature cooking and can making . . . *and watching the gas bills too!*

Experience in these plants show that Kemp 100 percent premixing of gas and air cuts fuel consumption 15 to 50 percent, that accurate control of flame characteristics and flame pressure permit new standards of quality and uniformity. Tell you more? Gladly. Address **The C.M.Kemp Manufacturing Company, 405 East Oliver Street, Baltimore, Maryland**

KEMP of BALTIMORE

demnations, according to the report, dropped from 2.7 per cent in 1938 to 1.6 per cent in 1939, insect infested flour seizures jumped during the year, but the report adds the "industry is attacking this problem in a serious minded way."

Short-fat, short weight butter and use of illegal synthetic flavoring led the list of causes given for food violations involving economic cheats.

Causes of Bad Flavor In Butter Reported

A symposium on flavor defects in butter and their probable causes featured the 31st annual meeting of American Butter Institute, held in Chicago, Dec. 5 and 6, with a registered attendance of 316. It was a continuation of the quality improvement program which has been under way for several years.

Reported results of studies on flavor defects indicate that they are microbiological and chemical in character and may arise from a variety of causes. V. L. Turgasen, supervisor of butter manufacture, Armour & Co., discussed flavor defects from the trouble shooter's observations in practice. Development of a cheesy flavor and odor has been associated with iron, manganese and sludge in wash water and with steam sterilization of cream by the flash method. In some instances cheesiness developed in printed butter but not in tub butter from the same churning. Upon investigation this appeared to result from aggregation of water globules because of pinholes in auger blades or the working action which caused focal accumulation of water in which bacteria could develop. Salt up to 2½ per cent showed no beneficial

FRANK PILLEY

effect. Heavy chlorination of the water supply was beneficial, but 48 p.p.m. caused corrosion in water pipes. By increasing the acidity of the water from a pH of 6.8–7.0 to 6.4 the chlorine could be reduced to 14 p.p.m. with no loss in bactericidal effectiveness but with elimination of corrosion.

Dr. B. W. Hammer, dairy bacteriologist, Iowa State College, characterized cheesy butter as similar to Cheddar and Swiss cheeses but more like a limburger flavor and odor, indicating protein putrefaction sometimes followed by development of rancidity. The flavor defect is international in its extent and develops rapidly in butter held at 60 to 70 deg. F. but slower at lower temperatures. The more thoroughly the butter is worked and the more uniformly the water content is dispersed the slower the development of the defect. It is a growing menace and associated with bacterial infection that is hard to identify because isolation of causative bacteria is difficult. *Ach. putrefaciens* has been associated with the development of cheesiness but is not regarded as the sole cause. Butter made with butter culture is less susceptible than nonculture butter. Carefully controlled pasteurization of cream, thorough cleaning and sterilization of churning equipment, and use of sterile or very low bacteria count water are helpful in keeping flavor defects to a minimum.

Harold Macy, University of Minnesota Farm, cited faulty pasteurization of cream because of inaccurate theremometer readings, improperly cleaned equipment, infected salt, lack of plant air washing, infected or dusty walls, ceilings and other plant surfaces, open surface coolers, uncovered vats and non-sterile packaging wrappers and cartons as sources of mold infection in butter. Frequent periodic checking of pasteurization equipment, use of 206 to 207 deg. F. water for daily washing of equipment for 20 to 30 min., keeping small units of wooden equipment in germicidal solutions which will not soften the wood, air conditioning or use of ultra-violet germicidal lamps where butter or cream will not be injuriously affected and chemical inhibitors are preventives of mold growth defects in butter.

C. H. Parsons, Swift & Co., recommended immediate cooling of cream, keeping the cream cool, frequent gathering of the cream from farmers, keeping No. 1 grade cream free from No. 2

Schedule of Action on Food Standards *

	Docket number and commodity	Type of standard or regulations	Presiding officer	A First announced in Fed. Register	B Initial hearing date	C Preliminary briefs due not later than	D Examiner's findings published in Fed. Register	E Secretary's order published in Fed. Register	F Effective date of order
5-I	Canned peaches			Mar. 7, '39	April 10, '39	June 26, '39[2]	Sept. 7, '39[4]	Dec. 22, '39	.....
5-II	Canned apricots	Identity,		Mar. 7, '39	April 10, '39	June 26, '39[2]	Oct. 5, '39[5]	.....	.....
5-III	Canned pears	quality, fill	J. M. Fox	Mar. 7, '39	April 10, '39	June 26, '39[2]	Sept. 19, '39[5]	.....	.....
5-IV	Canned cherries			Mar. 7, '39	April 10, '39	June 26, '39[2]	Oct. 11, '39[5]	.....	.....
6	Canned peas	Identity, quality, fill	J. M. Fox	Mar. 7, '39	April 17, '39	June 29, 39[2]	Nov. 9, '39[7]	.....	.....
7-A	Cream			Mar. 28, '39	May 1, '39	July 27, '39[2]	Sept. 26, '39	.....	.....
7-B	Whipping cream			Mar. 28, '39	May 1, '39	July 27, '39[2]	Sept. 26, '39	.....	.....
7-C	Evaporated milk	Identity	F. S. Hassell	Mar. 28, '39	May 1, '39	July 27, '39[2]	.....	.....	.....
7-D	Sweetened condensed milk			Mar. 28, '39	May 1, '39	July 27, '39[2]	.....	.....	.....
7-E	Dried skim milk			Mar. 28, '39	May 1, '39	July 27, '39[2]	.....	.....	.....
8	Canned vegetables	Identity	F. S. Hassell	Mar. 24, '39	April 24, '39	June 19, '39[2]	Aug. 15, '39	.....	.....
9	Coal-tar colors [1]	Listing and certification	F. S. Hassell	June 3, '39	July 5, '39	July 20, '39	Aug. 16, '39	Sept. 16, '39[6]	Sept. 16, '39[1]
10-A	Fruit jams	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[2]	.....	.....	.....
10-B	Fruit jellies	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[2]	.....	.....	.....
10-C	Fruit butters	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[2]	.....	.....	.....
11-A	Cheddar cheese			Aug. 22, '39	Sept. 25, '39	Dec. 1, '39[2]	.....	.....	.....
11-B	Washed curd cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Sept. 25, '39	Dec. 1, '39[2]	.....	.....	.....
11-C	Colby cheese			Aug. 22, '39	Sept. 25, '39	Dec. 1, '39[2]	.....	.....	.....
12	Cream cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Oct. 2, '39	Dec. 15, '39[2]	.....	.....	.....
13	Coal-tar colors [3]	Listing and certification	F. S. Hassell	Oct. 20, '39	Nov. 20, '39	Dec. 15, '39	.....	.....	.....

[1] Emergency declared to exist, order effective on publication.
[2] Time extended from earlier date previously announced.
[3] Amending order of Docket 4.
[4] Standard of identity only; standard of quality and standard of fill of container published in *Federal Register* on Sept. 15, '39.
[5] Standard of identity only; standards of quality and fill of container published in *Federal Register*, Oct. 24, '39.
[6] Typographical errors corrected in *Federal Register*, Oct. 20, '39.
[7] Standard of identity only; standards of quality and fill of container published in *Federal Register*, Nov. 25, '39.
* Dockets 1 to 4, pertaining to tomato products, canned tomatoes, eggs and egg products, and coal-tar colors, are completed and have been dropped from this table. See FOOD INDUSTRIES, October, page 569 for this data.

grade cream, use of small surface containers, and layering of cream additions instead of mixing them up as precautions to be observed for the production of improved quality butter.

J. D. Ingle, Swift & Co., V. Hussong, Sealtest System Laboratories, Inc., T. M. Olson, South Dakota State College, and P. A. Downs, University of Nebraska, focused attention on French weed instead of pepper grass as the vegetation in the dairy cows' feeding most responsible for the weedy or garlicky flavor in cream.

An increase in the number of milk cows during the next two years, with a consequent increase in milk production, was predicted by E. W. Gaumnitz, Department of Agriculture.

Members of the Institute elected these officers for 1940: president, Frank Pilley, Frank Pilley & Sons, Omaha; vice-president, Ralph M. Jewell, Jewell Ice Cream & Milk Co., Mount Vernon, Ohio; executive secretary-treasurer, N. W. Hepburn (re-elected).

Food Technologists to Meet

For its first meeting, the Institute of Food Technologists will convene at the Morrison Hotel in Chicago, June 17–19. This organization was formed last July at the close of the Second Conference on Food Technology held at Massachusetts Institute of Technology, Cambridge. Dr. D. K. Tressler, New York State Agricultural Experiment Station, Geneva, is chairman of the program committee and Dr. E. H. Harvey, Wilson & Co., Chicago, chairman of the local arrangements committee.

Wallace Launches Drive For Processing Taxes

What was contrary to the Constitution in the opinion of "nine old men" might be as right as the signature of John Quincy Adams in the eyes of the rejuvenated Supreme Court. And this apparently has occurred to Secretary Wallace, for he is knocking at the door of industry again with some brand new streamlined processing taxes which would be paid on the certificate plan. He launched his drive for the new taxes in a speech at Oklahoma City on Dec. 1. He wants these taxes in time to make the 1940 benefit payments to farmers when they market their crops, which as some Republican pointed out, would be before the November election.

The Secretary probably would limit the application of the new tax to cotton,

CONVENTIONS

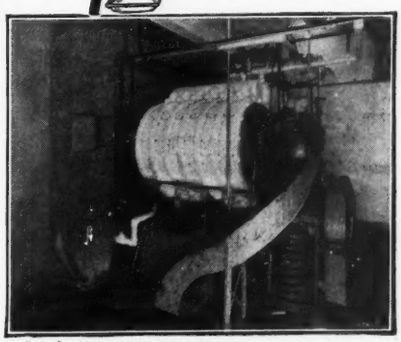
January

3– 5—Northwest Canners Association, Washington Hotel, Seattle, Wash.
8–10—Eastern Soda Water Bottlers' Association, Hotel Kimball, Springfield, Mass.
15–18—Annual Dairy Manufacturing Short Course, Texas A & M College, College Station, Tex.
17–18—New England Association of Ice Cream Manufacturers, Copley Plaza Hotel, Boston, Mass.
17–19—American Society of Refrigerating Engineers, Blackstone Hotel, Chicago.
20-25—National American Wholesale Grocers' Association, Congress Hotel, Chicago.
20–26—Big Ten Food Packers, Morrison Hotel, Chicago.
21–23—Potomac States Bakers Association, Lord Baltimore Hotel, Baltimore.
21–23—National Macaroni Manufacturers Association, Morrison Hotel, Chicago.
21–23—National Preservers' Association, Morrison Hotel, Chicago.
21–25—National Food Brokers Association, Palmer House, Chicago.
21–26—National Canners Association, Stevens Hotel, Chicago.
21–26—Canning Machinery and Supplies Association, Stevens Hotel, Chicago.
21–26—National Retailer-Owned Grocers, Sherman Hotel, Chicago.
21 (during week of)—Evaporated Milk Association, Blackstone Hotel, Chicago.
22—Old Guard Society (NCA), Stevens Hotel, Chicago.
22–25—National Sugar Brokers' Association, Palmer House, Chicago.
22–26—International Heating and Ventilating Exposition, Lakeside Hall, Cleveland, O.
23–25—Independent Grocers Alliance, Knickerbocker Hotel, Chicago.
24—National Pickle Packers Association, Palmer House, Chicago.

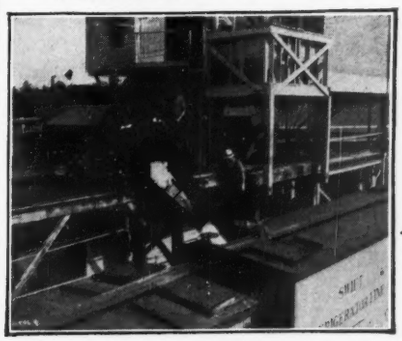
February

20–22—Pickle and Kraut Packers' Technical Conference, Michigan State College, East Lansing, Mich.

Yes Sir! Vilter PAKICE .. Saves Money in Car Icing, Too!



↑ Vilter 30 ton PAKICE Machine, showing Briquette Attachment and shute to floor below.



←Filling Car Bunkers with Vilter PAKICE Briquettes. Briquettes are made in unit at right, spouted from storage bin into platform truck, and shuted directly into car bunkers. Time and labor are minimized.

Vilter PAKICE, in Briquette form, has been saving money for Meat Packers since 1932, through convenient, effective, and economical Car Icing. PAKICE Briquettes are made right on the job—near your carloading platform—and shuted into your car bunkers.

Vilter PAKICE Briquettes are made under a tremendous pressure of 17 tons. They provide better refrigeration at a cost lower than other forms of ice. Their scientifically rounded contour (Ovoid Shape), providing a minimum of surface contact, prevents the surfaces from freezing together. Eliminates air tunneling. Because of their large melting surface, Briquettes produce colder temperatures more quickly. Briquettes are just as hard as Can Ice—with the same or lower moisture content.

Vilter Briquetting Machinery is available with PAKICE Units from 15 tons to 30 tons capacity. Vilter PAKICE Equipment is made for every size plant—in daily capacities of ½, 1, 2½, 5, and up to 30 tons in 5-ton increments. Write for YOUR Story of Savings in modern food protection.

★ CLIP THE COUPON FOR SAVINGS ON PAKICE

● Sausage Makers!
Use Vilter Crystallform PAKICE in Grinder or Chopper. Contains no large chunks to dull knives — or melt and sour the meat.

Supplier Since 1867 VILTER Refrigeration ... Air Conditioning

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Send us more details on Savings with Vilter PAKICE and Briquettes, to fit the following conditions:
Amount of Ice Used:
Car Icing: Daily ..... Annually .....
Sausage Making: Daily ..... Annually .....
Water: Temperature ..... Cost .....
Power: Volts ..... Phase ..... Cycle .....
Costs per K.W.H. .....
Present Cost of Ice per ton .....
Name .....
Address .....
City ..... State .....

wheat and rice, though he might include tobacco and hogs. The system of applying the taxes is this: Farmers would get production certificates if they agreed to abide by the acreage orders of the Secretary of Agriculture. Then the processors would have to buy these certificates when they bought the farmer's crops for use as raw materials. The value of the certificates would be the difference between the parity price of the product and the cost of production, plus the benefit payment.

According to Millers National Federation, the tax as applied to wheat is expected to be near 30 cents a bushel. And on the basis of this figure the cost to flour millers and consumers would amount to $141,785,616 each year.

Britain, France Set Up Joint Buying Board

In line with their decision to coordinate their war economies, the British and French governments have established a joint purchasing board in the United States and have opened two offices in New York, it was announced recently by the French Embassy in Washington. While coordinating their activities, the offices will operate separately. One will be under the British Purchasing Commission at 25 Broadway, with Arthur B. Purvis as general director. The other will be under the French Purchasing Commission, at 15 Broad St., in charge of Frederic Bloch-Laine. The two agencies together have been designated as the Anglo-French Purchasing Board in the United States, with Mr. Purvis as chairman and M. Bloch-Laine as vice-chairman.

More Cities, More Foods Put Under Stamp Plan

Between 30 and 35 cities or county areas will have the food stamp plan in operation before 1940 is well under way. By the end of the fiscal year, June 30, the plan probably will be operating in between 125 and 150 localities. Such is the revised expectation of officials of the FSCC and others interested in the program.

With the recent inclusion of Portland, Ore., San Francisco, Macon, Ga., Akron, Ohio, Richmond, Va., Memphis, Tenn., Los Angeles County, California, Lancaster County and Douglas County, Nebraska, and Portland, Me., Milo Perkins and his staff declare they now have sufficient experience to warrant swift and sure expansion of the program.

They point out that of the 20,000,000 people now on relief, approximately 15,000,000 would benefit by the extension of the plan to national scope. This means that the FSCC does not contemplate reaching the entire relief population within two or three years. But even so, the officials contend, the plan as now envisaged means the annual "take" would be 294,000,000 lb. of butter, 300,000,000 dozen eggs, 30,000,000 bu. of wheat (flour); 6,000,000 bu. of corn (corn meal); 120,000,000 lb. of rice; 78,000,000 lb. of prunes, 88,000,000 lb. of raisins, and 213,000,000 lb. of dry beans. In addition it is declared, that given the means, the poor will buy trainloads of citrus fruit, tomatoes, cabbage, peaches and other fruits and vegetables.

At the close of the year, sixteen commodities were being distributed under the plan. In December, oranges, grapefruit, rice, hominy grits and pork were added.

Construction News

	Pending (thousands)	Awarded December (thousands)	Total Awarded 1939 (thousands)
Bakery	$80	$240	$4,044
Beverages	1,035	474	6,663
Canning and Preserving	40	.....	200
Confectionery	100	.....	125
Grain Mill Products	680	1,285	4,780
Ice Manufactured	.....	.....	490
Meats and Meat Products	25	80	1,191
Milk Products	1,410	40	2,021
Miscellaneous	1,020	320	4,235
	$4,390	$2,439	$23,749

Corn Acreage Established

Under the Agricultural Adjustment Act of 1938, Secretary Wallace has established the corn acreage allotment for the commercial corn producing area for 1940. He placed the acreage at 36,638,000 acres.

Food Commodities Lower

Moving in the opposite direction to that exhibited by the general level of commodity prices, food commodities fell off somewhat in price during the month from mid-November to mid-December. While the general index of the *N. Y. Journal of Commerce* rose during the period from 80.9 to 81.8, the food commodity index of the same publication fell from 67.7 to 66.6. This fall was in spite of an increase in the index for grain commodities from 65.5 to 76.1.

Among the food commodity prices to exhibit decreases were all the meat products except beef, which was steady, and lard, which increased from $7 to $7.10. Sugar and coffee also decreased in price, while eggs, flour and grain increased. Canned foods decreased slightly, as did cottonseed oil. Cocoa also decreased somewhat. Butter and cheese showed some decrease in price in the same four-week period.

Wheat Climbs Up

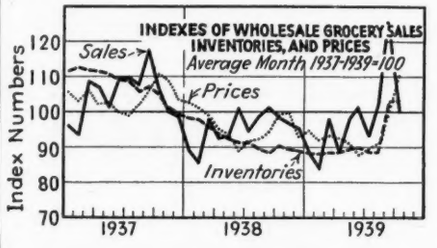
What war could not do, drought did with ease. Wheat, which had stuck to a range between 60 cents and 70 cents per bushel all through 1939 prior to September, was increased in price only about 15 cents per bushel by the war activity of September and October, leaving it still far below the farmer's desired price of $1 per bushel.

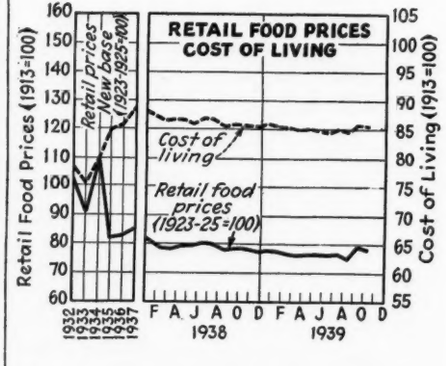
But as November and December went by with almost no rain in the winter wheat belt, reports began to come in characterizing 1940 prospects as the worst in years. By mid-November wheat had returned to its Sept. 15 high of 85 cents per bushel and by Dec. 15 the price had passed the dollar mark.

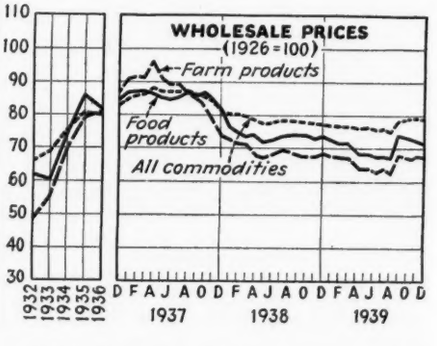
Just how permanent this rise in wheat prices may be will depend upon the weather in the next few months. Wheat supplies on hand are high, and should

Data for the Charts

In preparing the curves shown on this and the succeeding page of Food Industries, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* data on wholesale grocery sales, inventories and prices are from U. S. Department of Commerce.







prospects for the 1940 crop improve, the high price cannot hold, as little or no war buying of U. S. wheat is likely this year. But, if drought conditions hold or grow worse, prospects are for a 1940 crop so far below domestic needs that the existing surplus would be deeply cut and existing price would hold or go even higher.

Meat Prices Low

Comparison between meat prices at the end of 1939 and the end of 1938 showed a generally lower level in 1939. Beef at 14 cents compared to 14½ cents a year before; lamb prices were, respectively, 15 cents and 17½ cents, pork loins stood at 11½ cents compared to 14 cents, and lard had dropped from $7.45 to $7.10. Supplies were ample and tending to increase. This is an outstanding example of the fact that supply and demand make prices, in spite of war emergencies.

INDICATORS

SALES of confectionery and competitive chocolate products in October, 1939, were $24,425,000, compared to $25,260,000 in September, 1939, and $23,087,000 in October, 1938.

FLOUR PRODUCTION in November, 1939, according to *The Northwestern Miller,* reporting for mills representing 64 per cent of U. S. production, totaled 5,300,889 bbl., compared to 6,381,680 bbl. in October, 1939, and 5,612,323 bbl. in November, 1938.

SUGAR DELIVERIES in the United States for the first ten months of 1939, according to the U. S. Department of Agriculture, were 5,901,696 short tons, raw value, compared to 5,517,860 tons in the same period of 1938.

CITRUS FRUIT and juice packed in Florida in the past season totaled 11,377,638 cases, a high record, and comparing to 8,260,411 cases packed in 1938.

CUCUMBERS for pickles produced in 1939 are estimated at 3,863,000 bu., 37 per cent below the 1938 output and 26 per cent below the 1928–1937 average.

GRAPEFRUIT SEGMENTS packed in the U. S. during the 1938–1939 season totaled 4,228,620 actual cases, including the Puerto Rico pack.

GRAPEFRUIT JUICE packed in the U. S. in the 1938–1939 season, excluding that packed for the Federal Surplus Commodity Corporation, totaled 9,199,246 actual cases.

MEAT PRODUCTION in November, 1939, was between 5 and 10 per cent higher than in November, 1938, and from 15 to 20 per cent above the 1929–1933 average for the month, according to the American Institute of Meat Packers.

SALMON packed in Alaska in 1939 is now estimated as totaling 5,136,400 cases, a figure 23.5 per cent below the 1938 output.

FISH, frozen, in storage on Nov. 15, 1939, totaled 84,506,000 lb., compared to 93,024,000 lb. on the same date in 1938 and an average of 83,492,000 lb. for the month in the preceding five years.

BUTTER, creamery, produced in October, 1939, was 121,595,000 lb., according to the Agricultural Marketing Service. This compares to 136,990,000 lb. produced in October, 1938, and is 3 per cent below the 1930–1937 average for the month.

BUTTER, creamery, produced during the first ten months of 1939, at 1,526,680,000 lb., was 1 per cent below the production recorded for the corresponding period of 1938.

CHEESE PRODUCTION in October, 1939, was 41,310,000 lb., according to the Agricultural Marketing Service, 4 per cent below the corresponding month last year.

WINE CONSUMPTION, California wines, in the first nine months of 1939 was at a high record of 42,731,241 gal., 21 per cent above the same period in 1938.

FRUIT, frozen, in storage, on Dec. 1, 1939, totaled 140,210,000 lb., compared to 138,330,000 lb. one year before, and an average in 1934–1938 of 99,428,000 for the date.

VEGETABLES, frozen, in storage Dec. 1, 1939, amounted to 75,612,000 lb., compared to 68,853,000 lb. on Dec. 1, 1938.

BUTTER, creamery, in storage on Dec. 1, 1939, was 89,752,000 lb., compared to 160,632,000 lb. on Dec. 1, 1938, and to an average in 1934–1938 of 93,734,000 lb. for the date.

CHEESE, all kinds, in storage on Dec. 1, 1939, amounted to 112,211,000 lb. The figure one year before was 127,440,000 lb., and the 1934–1938 average was 113,055,000 lb. for the date.

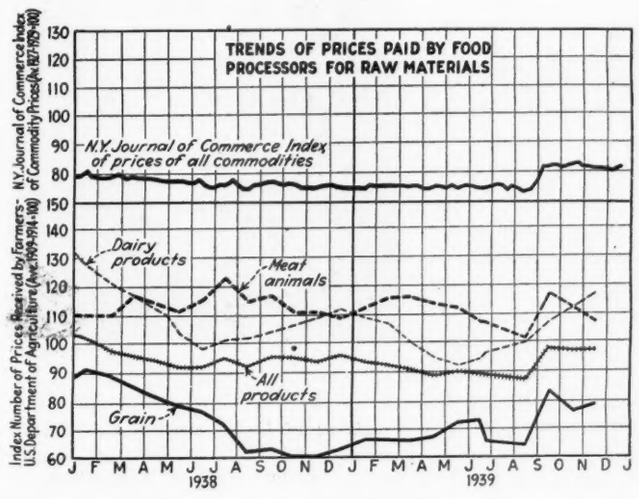
EGGS, case equivalent, in storage on Dec. 1, 1939, totaled 4,088,000 cases, compared to 3,670,000 cases on Dec. 1, 1938, and to an average for Dec. 1 in 1934-1938 of 4,599,000 cases.

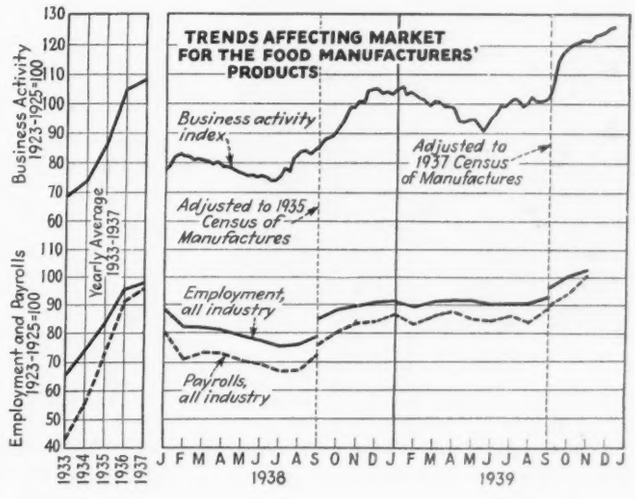
POULTRY, frozen, all kinds, in storage on Dec. 1, 1939, was 127,030,000 lb., compared to 118,088,000 lb. a year before and to an average in 1934–1938 of 113,578,000 lb. for the date.

MEAT, all kinds, in cure and frozen storage on Dec. 1, 1939, totaled 472,457,000. The figure one year previously was 409,201,000 lb. and the 1934–1938 average for Dec. 1 was 553,869,000 lb.

LARD in storage on Dec. 1, 1939, was 88,540,000 lb., compared to 74,499,000 lb. on Dec. 1, 1938, and to an average of 71,793,000 lb. for Dec. 1 in the years 1934–1938.

WEEKLY FOOD INDEX of Dun & Bradstreet, Inc., for Dec. 12, 1939, was $2.32. The figure for the corresponding date in 1938 was $2.38.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
Index Number of Prices Received by Farmers - U.S. Department of Agriculture (Ave. 1909-1914=100)
N.Y. Journal of Commerce Index of Commodity Prices (Ave. 1927-1929=100)
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939


Business Activity 1923-1925=100
Employment and Payrolls 1923-1925=100
Yearly Average 1933-1937
1933 1934 1935 1936 1937
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business activity index
Adjusted to 1937 Census of Manufactures
Adjusted to 1935 Census of Manufactures
Employment, all industry
Payrolls, all industry
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939

Men, Jobs & Companies

INDUSTRY

Abbotts Dairies, Inc., Philadelphia, will construct a one-story brick and steel dairy plant at Port Allegany, Pa., to cost $50,000, with equipment.

Apte Bros. Canning Co., Miami, has leased 20 acres of land and two buildings at Lake Garfield, Fla. The buildings, one 100 x 200 ft., the other 100 x 450 ft., will be remodeled and equipped with new machinery.

Blue Moon Cheese Products, Inc., Minneapolis, has purchased the buildings and 40-acre site of Big Four Canning Co. at Thorp, Wis., and is making Thorp its headquarters.

Brass Yeast Corp., Newark, N. J., has changed the corporation name to Republic Yeast Corp., following reorganization. New financing was arranged by C. P. Gulick, chairman of the board of directors.

Carnation Milk Co. will spend about $300,000 expanding its facilities in North Carolina. A condensary will be built at Statesville and a milk receiving station established at Shelby. The company recently opened a plant at Albemarle.

Coca-Cola Co. has lost its trademark infringement suit against Pepsi-Cola in a judgment handed down by the Canadian Supreme Court. The case will be carried to the privy council in England, the final court of appeal.

ARTHUR W. RAMSDELL

Borden Co., New York, has elected him vice-president in charge of sales of evaporated, condensed and malted milk, cheese, mince meat and caramels.

Harris & Ewing

FLETCHER H. RAWLS

He has been renamed chief of the foodstuffs division of the Bureau of Foreign and Domestic Commerce, Washington, D. C. For the past two years he has acted as assistant director of the Bureau. Roy Mundee has been assigned to special industrial research for the foodstuffs division.

Crampton Canneries, Inc., Celina, Ohio, has purchased the Norwalk, Ohio, plant of Standard Brands, Inc.

Cudahy Packing Co. has filed suit against the government for refund of $308,182 alleged to have been paid as process taxes under the Agricultural Adjustment Act of 1933, which was later voided by a Supreme Court decision.

Furnas Dairy Co., Newark, Ohio, is constructing a $125,000 modern creamery building.

General Foods Corp. is planning a $50,000 improvement of its Jell-O plant at LeRoy, N. Y.

General Mills, Inc., has adopted a contributory employes' pension system.

Golden Age Gingerale Co. of Ohio has purchased the plant, franchise and equipment of Pepsi-Cola Bottling Co. at Houston, Tex.

Great Atlantic & Pacific Tea Co. is constructing a $400,000 addition to its Quaker Maid plant at Terre Haute, Ind. Floor space of the new building will be 180,000 sq. ft. A & P recently opened a coffee roasting plant at Jacksonville, Fla., to serve North and South Carolina, Georgia and Florida, formerly served by the Brooklyn, N. Y., plant.

Jackson Cookie Co. is completing a fourth expansion with a new bakery in north Little Rock, Ark. New equipment to be installed will include an oven to bake 60,000 vanilla wafers or 20,000 cookies per hour.

Kroger Grocery & Baking Co. has doubled the size of its beef tenderizing plant at Cleveland which now has a capacity of 9,000,000 lb. of beef per year. The company plans a $300,000 addition to its manufacturing plant in St. Louis.

Meyer Kornbloom Packing Co., Kansas City, will build a two-story, 49 x 120 ft. brick and reinforced concrete packing plant at an estimated cost of $75,000.

Mutual Citrus Products Co., Anaheim, Calif., is erecting a new plant designed to process at least 3,000 tons of apples a year.

Producers Milk Co., Cleveland, is erecting a $50,000 four-story addition to its ice cream plant.

Swift and Co. has announced plans for a new cheese, butter and ice cream plant in Montgomery, Ala.

Greystone Studios, Inc

WARD MAGILL

President of Kansas Milling Co., Wichita, he has accepted the nomination as president of Millers National Federation.

WORTHINGTON

100 YEARS

1840 - 1940

"WHAT IS RIGHT WILL PROVE ITSELF RIGHT"

THUS WROTE Henry R. Worthington, a great engineer-inventor, in 1876. He continued, "I have asked for an answer to the question . . . Have I been able permanently to improve the department of engineering, in which I have steadily and exclusively worked?"

» Today, the company which he founded, its products in use in every country in the world, with plants that cover hundreds of acres, with the value of its manufactures reaching hundreds of millions of dollars, looks back over a century's span, and sees proved the essential soundness of its founder's vision and ideals.

» In its century of growth it has pioneered in many significant basic engineering developments of widespread application. Itself a pioneer, it has pushed forward shoulder to shoulder with pioneers, across continents and over the seven seas. It has witnessed the birth and growth of a new age. It has seen a whole new civilization develop, and has accepted the continued challenges of that civilization. Looking back on its rich and fruitful past, it turns to its second century confident of its ability to carry on with the splendid spirit and vision of its founder.

» Worthington's maturity finds expression in a notable group of engineering products with standards of excellence and records of performance unsurpassed in their respective fields . . . for the petroleum industry in production, transportation and refining . . . for gas and oil pipe lines and distribution . . . for refrigeration and air conditioning in every branch . . . for steam power, land and marine, including turbines, condensers, feedwater heaters and auxiliaries . . . feedwater heaters for railway locomotives . . . Diesel and gas engine units covering a wide power range . . . air and gas compressors for all industrial uses . . . a comprehensive line of contractor equipment . . . and pumping equipment whose scope is the most extensive available.

» It has been said that an institution is the lengthened shadow of a man. Perhaps more true of the Worthington Pump and Machinery Corporation than of most institutions, it yet is not the whole truth. This corporation is not only the lengthened shadow of one man, but of many men who have given the best of their keen minds and stout hearts, that their science and engineering could better serve not only their company but also the civilization of which they and it have been such important parts.

Harry G. Beaver

PRESIDENT

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

Moore Steam Turbine Division . . . Carbondale Air Conditioning and Refrigeration Division
Worthington-Gamon Meter Company

M10-1

PERSONNEL

H. B. Berthold, Charleston, heads up West Virginia Dairy Products and Ice Cream Manufacturers Association.

Harry L. Brown, assistant secretary of Agriculture, has resigned to join the agricultural department of Tennessee Valley Authority.

Harry A. Cronk has resigned as chairman of the directing board of the Borden's Farm Products—division of Borden Co., New York, after 37 years of service with the company.

Walter G. Dunnington, senior partner of the law firm of Dunnington, Bartholow and Miller, has been elected a director of Standard Brands, Inc.

A. W. Griffin, Johnson City, has been named president of Tennessee Bottlers Association.

David M. Keiser has succeeded his father, the late George E. Keiser, as president of Cuban American Sugar Co Henry A. Clark, a director, becomes first vice-president, taking over the former duties of Mr. Keiser.

M. E. Knouse, Peach Glen, heads up Pennsylvania Canners Association.

Bryce Landt, Kilbourne, has been named president of Wisconsin Dairy Industries Association.

Roy Molan, former merchandise manager for Purity Bakeries, Chicago, has leased the Mohr Baking Co. plant at Sheboygan, Wis. He plans a $30,000 remodeling job.

Robert H. Montgomery, former vice-president and sales manager of Waggoner-Gates Milling Co., Independence, Mo., has been appointed vice-president and general manager of Stanard-Tilton Milling Co., Alton, Ill.

John I. Ormond, manager of the Albert Lea, Minn., plant of Ward Dry Milk Co., has been transferred to the company's offices in Chicago.

Russell A. Rinklin, Jefferson City, has been named president of Missouri Bottlers of Carbonated Beverages Association.

Edwin L. Schujahn, manager of grocery products operations in Buffalo for General Mills, Inc., has been advanced to the vice-presidency of Washburn-Crosby Co., the eastern division of General Mills.

Dr. Evald L. Skau has been appointed senior chemist in the oil, fat and protein division of the Southern Regional Research Laboratory, New Orleans. He will investigate the physical and chemical methods of separating the fatty acids and glycerides of cottonseed and peanut oils.

Dr. William J. Sparks, as the new chief of the oil and protein division, Northern Regional Research Laboratory, will be in charge of research on the properties and composition of corn and wheat oils and will direct investigations on the chemical modification of vegetable oils. He will also direct the development of wider industrial utilization of corn proteins.

George C. Spitzmiller has been advanced to the newly created position of vice-president and general manager of the central division of Best Foods, Inc., with headquarters in Chicago. William O. Dillingham will fill his former position as eastern division sales manager, with headquarters in New York.

Roland E. Tognazzini has been elected president of Union Sugar Co., San Francisco, to replace Edmunds Lyman, who has resigned but who will remain as a director in charge of public relations.

Wade Utley, long identified with the margarine and mayonnaise industry and formerly president of Capitol City Pro-

See HTH PRODUCTS*
Slash Spoilage Losses, Guard Purity

1. More and more dairy plants are guarding the quality of their product "from cow to consumer" by placing in the hands of their milk producers a dependable sterilizer like Lo-Bax or HTH-15. Both these products are so low in cost and easy to use that producers can apply effective bactericidal treatment freely to milking machines, surface coolers, pails, cans, strainers, etc.

2. Distilleries have found HTH Products valuable in disinfecting fermenting vats and other equipment; wineries use these dependable sterilizers in keeping tanks sweet and in general deodorizing and disinfecting around the plant. Just as in other branches of the food industries, HTH Products do an effective job of bacteria control — quickly, economically.

3. A safe water supply is vital to most food plants and is often a problem for those having to depend on wells or other water sources of their own. HTH Products contain available chlorine in convenient dry form and may often be the answer to water treating problems of this sort just as for the destruction of algae in condenser water, the disinfection of cooling water in canneries, etc.

● In beverage plants and food plants alike, that silent thief, bacterial contamination, may cause serious financial loss unless effective means are found to keep this menace in check.

HTH Products have proved their efficiency as practical, dependable germ-killers in hundreds of food and beverage plants.

HTH Products are chlorine sterilizers in powder form—convenient to use, always full strength. Their action is quick and dependably effective. You just add them to water — they make germicidal hypochlorite solutions of the strengths needed to flush or spray any surfaces with which your food or beverage products come in contact. HTH Products are so economical you can use them freely throughout the plant.

Write today for complete information on HTH Products and their easy, effective use.

HTH PRODUCTS

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* HTH PRODUCTS (HTH, HTH-15 and LO-BAX) . . . DRY ICE . . . CARBONIC GAS . . . AMMONIA, ANHYDROUS and AQUA . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . PH-PLUS (FUSED ALKALI) . . . SYNTHETIC SALT CAKE

ducts Co., Columbus, Ohio, has become associated with Standard Nut Margarine Co., Indianapolis.

J. J. Vollertsen, chief chemist of Armour & Co.'s control laboratory, has assumed charge of the development department of the newly formed chemical division. The chemical division is under the direction of L. E. McCauley, company treasurer, and J. L. Hunt of the research department. M. L. Laing has been advanced to chief chemist. E. P. Poland becomes bacteriologist, while Victor Conquest continues as director of research.

Marcel J. Voorhies, agricultural extension economist of Louisiana State University, has been named acting general manager of American Sugar Cane League to succeed Reginald Dykers.

William G. Wolf, recently in charge of manufacturing operations of Siren Mills division of Lamont Corliss & Co., Fulton, N. Y., has become plant superintendent of the newly formed Cook Chocolate Co., Chicago.

W. G. Wormley, formerly associated with Standard Brands, Inc., is now with California Conserving Co., Hayward, Calif.

DEATHS

Nathan C. Blackburn, 78, founder of Blackburn Milling Co., Omaha, Nov. 4. He had been connected with the milling industry in Nebraska since 1883.

Simon T. Budd, 86, founder of Budd Dairy Co., Columbus, Ohio, Nov. 11.

John C. Diehl, 67, president of Defiance (Ohio) Milk Products Co. and vice-president of Christ Diehl Brewing Co., Nov. 24.

Christian Glaser Hupfel, 67, secretary and treasurer of the brewing corporation bearing the name of his father, the late John Christian Glaser Hupfel, Dec. 5, at New York.

George Jourdan, 83, president and founder of Jourdan Packing Co., Chicago, Dec. 9.

William H. Ritter, 70, president of P. J. Ritter Canning Co., Bridgeton, N. J., Dec. 7.

Karl W. Stoll, 54, president and founder of Pure Food Factory Hansa, Mamaroneck, N. Y., manufacturers of bouillon cubes and extracts, Dec. 11.

Joseph Vincent, 84, founder of Vincent Syrup Co. and organizer of Independent Sugar Co., now merged with Great Western Sugar Co., Dec. 8, at Denver.

Willard E. Wilber, 83, former president of Lake Zurich Dairy Co., Dec. 10, at Dundee, Ill.

ASSOCIATED INDUSTRIES

Continental Can Co., Inc. has realigned executive positions, effective Feb. 1. J. F. Hartlieb, executive vice-president, has been promoted to the presidency to succeed O. C. Huffman, who will become chairman of the executive committee. C. C. Conway, who had been chairman of the executive committee, will continue as chairman of the board.

E. P. Heckel & Associates has been formed as consultants on air conditioning, with offices in Chicago.

Link-Belt Co., Chicago, has advanced Ralph M. Hoffman to assistant to the president.

Marco Co., Inc., Philadelphia, has named E. L. French Co. of New York City as exclusive representative for New York state.

William Sealing Corp., Decatur, Ill., has elected D. W. Hill president. The corporation is a subsidiary of Crown Cork and Seal Co., Inc.

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Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

AIR CONDITIONING — The Austin Co., Cleveland, Ohio, claims that operating costs are usually less in single story than in multistory industrial buildings in an 8-page study on the comparison of building and operating costs, the relative advantages and disadvantages of each, with special emphasis on the relative adaptability to air-conditioning installations.

AIR CONDITIONING — "Refrig-O-Miser", which automatically uses outdoor air as a cooling agent whenever it is lower in degree than the desired indoor temperature, is introduced in 12-page Catalog No. 540, by United States Air Conditioning Corp., Northwestern Terminal, Minneapolis, Minn.

COOLING UNIT—Bulletin 48, of Jensen Machinery Co., Inc., Locust at Nelson St., Bloomfield, N. J., discusses the short gas flow recirculating chilled water unit for use in cooling liquids.

COUNTER FREEZER—1940 models of counter ice cream freezers of The Bastian Blessing Co., 242 E. Ontario St., Chicago, Ill., are announced in Freezer Catalog F-160.

FILLING EQUIPMENT—The Pfaulder Co., Rochester, N. Y., has published the following: Bulletin No. 789 on Model D-8 rotary bottle filler and capper; and Bulletin No. 790 on piston type fillers for delivering products to open top containers of glass, tin or fiber.

DAIRY EQUIPMENT—Recent publications of The Creamery Package Mfg. Co., 1243 Washington Blvd., Chicago, Ill., on equipment for dairies, creameries and ice cream plants, include: Bulletin M-6, "The CP Heavy Duty Fruit Feeder" for feeding and distributing large pieces of fruits, nuts and candies into stiff ice cream as it is discharged from the freezer; Bulletin M-2, "Continuous Ice Cream Freezer"; Bulletin M-438, "Fort Atkinson 40 Quart Ammonia Ice Cream Freezer", with super-whip reaction dasher; Bulletin B-467, "Wizard and Progress Cold Hold Tanks", for use as storage tanks; Advance Bulletin M-4 on package fillers; and Bulletin B-226, "Cold-Hold Storage Tanks", for storing liquid dairy and food products.

FILTERS — Oliver United Filters, Inc., 33 W. 42nd St., New York, N. Y., has brought out Bulletin No. 209, on the Precoat filter for food products, operating continuously under vacuum or pressure.

GRINDING MILLS — Heavy duty gradual reduction grinders and "Blue Streak" triple reduction dual screen mill are discussed in detail in two recent bulletins of Prater Pulverizer Co., 1825 S. 55th Ave., Chicago, Ill.

GRINDING MILLS—Catalog No. 392, of The Patterson Foundry & Machine Co., East Liverpool, Ohio, deals with pebble and ball mills for grinding food products such as albumen, sugar, chocolate, dried meats and vegetables.

MILK COOLERS — Information on stainless steel coolers featuring controlled flow refrigeration for dairy use is presented in 16-page illustrated Bulletin 89, by Mojonnier Bros. Co., 4601 W. Ohio St., Chicago, Ill.

MILK PACKING MACHINE—Pure-Pak Division, Ex-Cello Corp., 1216 Oakman Blvd., Detroit, Mich., announces the "Junior" milk packaging machine, designed for small or medium size dairies, in a recent 8-page illustrated booklet.

OVENS—Oven Division, American Machine and Foundry Co., 511 Fifth Ave., New York, N. Y., has issued a 4-page bulletin on single lap thermo-radiant tray ovens for heavy duty service in bakeries.

PACKING PLANT EQUIPMENT—The Cincinnati Butchers' Supply Co., 2145 Central Parkway, Cincinnati, Ohio, has published an indexed leather composition bound, 232-page Catalog No. 54, presenting its complete line of abbatoir and meat packing plant equipment with illustrations, dimensions, capacities and diagrams.

PRESSES—T. Shriver & Co., 803 Hamilton St., Harrison, N. J., has published illustrated Catalog No. 38 dealing with filter presses and diaphragm pumps, complete with data on specifications, sizes and capacities, types and application.

PRESSURE VESSELS—Bulletin 1020 of Alco Products, Division of American Locomotive Co., 30 Church St., New York, N. Y., deals with pressure vessels and heat exchangers.

REFRIGERATING EQUIPMENT—Trenton Auto Radiator Works, Trenton, N. J., has published a 50-page illustrated Bulletin No. 100 with engineering data, on commercial refrigeration equipment, on its 25th anniversary; and Bulletin No. H. 139 on unit heaters.

REFRIGERATION MACHINES—Carrier Corp., Syracuse, N. Y., has issued two new bulletins on refrigeration machines of ½ and ¾ hp. capacities; one describes an air cooled condensing unit, and the other a water cooled unit.

STONEWARE EQUIPMENT — Maurice A. Knight, Kelly Ave., Akron, Ohio, has issued a general catalog on "Knight-ware" acid-proof chemical stoneware, its construction and application.

TANKS—The U. S. Stoneware Co., Akron, Ohio, has issued Bulletin No. 404 entitled, "Storage and Mixing Equipment for Acids and Corrosive Chemicals."

WATER CONDITIONING — Bulletin No. 2233, of The Permutit Co., 330 W. 42d St., New York, N. Y., deals with the electro-chemical feed for apportioning chemicals in wet form at a constant or variable rate.

WATER CONDITIONING EQUIPMENT

—The accelerator for reducing alkalinity and removing organic matter from water, and the disk filter for removing suspended matter from water that is already comparatively clean, are announced by International Filter Co., 325 W. 25th Place, Chicago, Ill., in Bulletins No. 1823 and 1600, respectively.

Plant Accessories and Supplies

ARC WELDING—"101 Welding Ideas for Low-Cost Maintenance" is the title of 16-page illustrated Bulletin 405, of The Lincoln Electric Co., Cleveland, Ohio, showing a variety of applications of arc welding.

ASH HANDLING SYSTEMS—"Hydrojet" systems for continuous storage of ashes over a considerable period of time and their periodic removal are described with charts, illustrations and engineering data in 34-page Catalog No. 639, by Allen-Sherman-Hoff Co., 225 S. Fifteenth St., Philadelphia, Pa.

AIR HEATERS—Full details on the new heavy duty indirect air heater, for ovens, dryers and space heating, gas or oil fired, are given in 8-page illustrated Bulletin No. 74, by Despatch Oven Co., Minneapolis, Minn.

BRONZE PRODUCTS—Johnson Bronze Co., 310 S. Mill St., New Castle, Pa., has issued a new size and weight listing of "Universal" bronze bars, and a catalog describing "Ledaloyl" self-lubricating bearings and bushings, available in more than 300 sizes.

CHAIN VISE—The "Whitney" Universal chain vise for simplifying installation and repair of cottered or riveted type roller chain in pitches from $\frac{5}{8}$ in. to $2\frac{1}{2}$ in. inclusive is described in a recent leaflet by The Whitney Chain & Mfg. Co., Hartford, Conn.

CONDENSERS—Form 9424, of Ingersoll-Rand Co., 11 Broadway, New York, N. Y., features disk-flow, counter-current type barometric condensers, their advantages, performance readings, specifications and operation.

CONTROL INSTRUMENTS—The Brown Instrument Co., Philadelphia, Pa., has issued illustrated Booklet No. 2-17, featuring a new line of thermometers and pressure gages.

DUST CONTROL—Cloth screen dust collectors for control of dust and typical installations of Type "CH" collectors form the subject of Folders No. 2046 and 2045, respectively, of Pangborn Corp., Hagerstown, Md.

LIPTON goes to market
with a New Line of Packages

. . . wrapped on our New FA-Q Adjustable Machine

Here's another big name added to the list of prominent manufacturers using our new Model FA-Q machines.

As modern as the package it wraps, the versatile FA-Q handles all four sizes of the new Lipton's Tea packages shown above . . . *that's real size range for you!*

Moreover, the machine can be adjusted for different sized packages *in only 10 minutes*—⅓ of former time required. (This change covers all three dimensions.) All adjustments are made by hand-wheels conveniently located —no tools needed.

The FA-Q may be equipped to handle any type of wrapping material . . . glassine, transparent cellulose, waxed paper, foil, or plain paper wrappers. Electric Eye registration permits the use of printed material in economical roll form—locates the printing accurately no matter how long the run.

It's easy to see why this machine has won wide popularity among manufacturers in many different industries. Cutting down labor costs, stepping up production speeds, economizing on wrapping material, reducing floor space—the FA-Q offers the utmost in modern machine wrapping.

Consult our nearest office for further information.

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Peterborough, England: Baker Perkins Ltd. Melbourne, Australia: Baker Perkins Pty., Ltd.
Mexico, D. F., Apartado 2303 Buenos Aires, Argentina: David H. Orton, Malpu 231

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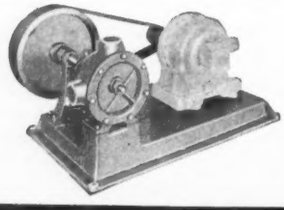
Over a Quarter Billion Packages per day are wrapped on our Machines

Is Old Man Time ready to put the finger on your pumps? Well, beat him to the punch and start the new year off right by replacing worn out units with new, sturdy, economical Viking Rotary Pumps.

Start out 1940 with a clean bill and enjoy increased pumping efficiency — and decreased pumping costs for years to come. Bulletin 103-35 is a good way to start . . . write for an illustrated copy.



VIKING
PUMP COMPANY
CEDAR FALLS, IOWA

ELECTRIC EQUIPMENT — General Electric Co., Schenectady, N. Y., has published the following: Bulletin GEA-2080 on a-c and d-c solenoids for general industrial application; Bulletin GEA-3071A on diesel-electric locomotives for operation in and around industrial plants; Bulletin GEA-2420 on capacitor-motor for most pumping operations; Bulletin GEA-2426B on oil-blast circuit breakers, Type Flo; Bulletin GEA-2596A on metal-enclosed switchgear with draw-out air circuit breakers for low-voltage feeders; and Bulletin GEA-3085A on single-phase oil-immersed "Spirakore" distribution transformers of new wound-core construction.

EXPANSION JOINT—A piston-ring expansion joint that can be unpacked and repacked under full operating pressure is the subject of 12-page illustrated Bulletin No. 35–15A, of American District Steam Co., North Tonawanda, N. Y.

FLUORESCENT LIGHTING—Typical installations of fluorescent strip and reflectors for industrial lighting are illustrated in a recent folder by The Wiremold Co., Hartford, Conn.

GENERATOR SETS—A complete line of diesel electric generating sets is described with diagrams, mounting dimensions, data and illustrations, in Bulletin No. 963, by The Buda Co., Harvey, Ill.

IRON PRODUCTS—Joseph T. Ryerson & Son, Inc., 16th & Rockwell Sts., Chicago, Ill., has published a new indexed 144-page "General Data Book" and 240-page 1939 "Stock List", No. 2, giving listings, illustrations and dimensions of its complete line of certified steel products.

MAGNET WIRE—Two publications on magnet wire and coils; one a 92-page illustrated Catalog No. C-352, and the other, a 40-page pocket size handbook; have been issued by Anaconda Wire and Cable Co., 25 Broadway, New York, N. Y.

METAL TUBING—The American Brass Co., Waterbury, Conn., presents 24-page illustrated Bulletin SS-25 covering seamless flexible metal tubing, its uses, installation, specifications, and engineering data.

PAPER PULLEYS—A complete list of stock sizes of paper pulleys available from Rockwood Mfg. Co., 1801–2001 English Ave., Indianapolis, Ind., is given in Bulletin No. 860.

OVENS—Steiner-Ives Co., Bloomfield, N. J., has issued Bulletin No. 3801 on "Zephyr" ovens for quality pan and hearth goods for the industrial and institutional trade, as reprinted from *Bakers Weekly* advertisements.

POWER TRANSMISSION — Bulletin 75, of Morse Chain Co., Ithaca, N. Y., presents illustrations and statistical data on roller chain drives, silent chain drives, free wheeling clutch, couplings, and universal drives.

PUMP—Bulletin No. 313, of Nash Engineering Co., South Norwalk, Conn., deals with a new glass centrifugal pump made of "Pyrex" brand heat and shock resisting glass.

PUMPS—Bulletin 606, of Waukesha Foundry Co., Waukesha, Wis., deals with the rotary sanitary seal pump designed especially for handling dairy, ice cream, canning, and carbonated beverage products.

PUMPS—Ingersoll-Rand, 11 Broadway, New York, N. Y., has published Form 1917 describing the new "Motorpump" designed for all types of general service in sizes from 5 to 1,000 gal. per minute; and Form 7502-J dealing with a new line of industrial compressors and vacuum pumps in sizes from $\frac{3}{4}$ through 5 hp.

SPEED CHANGER—Bulletin B 6013, of Allis-Chalmers Mfg. Co., Milwaukee, Wis., lists sixteen advantages of "Vari-Pitch Speed Changer" and shows pictures of typical industrial installations.

SPEED REDUCERS — Worm-helical speed reducers designed for continuous operation coupled direct to electric motors are discussed in 16-page illustrated Bulletin 75, by W. A. Jones Foundry and Machine Co., 4401 Roosevelt Rd., Chicago, Ill.

SPEED CONTROL—Type V-S drive speed control for 1 hp. units and up are described in a recent folder by Reliance Electric & Engineering Co., Ivanhoe Rd., Cleveland, Ohio.

UNIT HEATERS—Carrier Corp., Syracuse, N. Y., announces the addition of a floor unit to its line of gas fired unit heaters in Catalog 46J-3.

WATER PUMP—Bulletin No. 34, of Pomona Pump Co., 206 E. Commercial St., Pomona, Calif., features outstanding advantages of the small purpose jet pump water-pressure system.

VALVES—An illustrated, 136-page, general catalog No. 78, leather bound, describes a complete line of valves, boiler mountings, lubricating devices,

oil and grease cups, whistles, cocks and fittings, of The Lukenheimer Co., P.O. Box 360, Annex Station, Cincinnati, Ohio.

WEIGHING EQUIPMENT—"Looking in on 'Honest Weight'", covering Toledo scale activities, and "45,000 Ways to Weigh", pictorially presenting adaptions of Toledo models, have been published by Toledo Scale Co., Toledo, Ohio.

WEIGHT SCALES — Thwing-Albert Instrument Co., 3339–41 Lancaster Ave., Philadelphia, Pa., announces the desk type basis weight scales for laboratory, office and mill use, in a recent broadside.

Trucks, Tractors & Accessories

TIRES—Information on tires for trucks, buses, trailers and tractors is presented in the 96-page 1939 illustrated "Operators Handbook", published by The B. F. Goodrich Co., Akron, Ohio.

TRANSPORTATION — Motor Terminals, Inc., 420 Lexington Ave., New York, N. Y., describes the Fitch System of coordinated rail and highway transportation in a folder which illustrates a 4,000 gal. loaded truck and a 20 ft. steel truck body being transferred mechanically from rail car to highway vehicle in 90 seconds at the N. Y. World's Fair.

TRUCKS—A guide for truck drivers with suggestions for cutting costs and playing safe has been published by Dodge Division of Chrysler Corp., Detroit, Mich.

Packaging

BAGS—Ten "most often asked" questions on waterproof bags are answered in a recent brochure by Bemis Bro. Bag Co, 601 South Fourth St., St. Louis, Mo.

CARTONS—"Fashions in Cartons", title of a folder issued by Robert Gair Co., Inc., 155 E. 44th St., New York, N. Y., illustrates 62 different carton styles.

PACKAGING — The Karl Kiefer Machine Co., Cincinnati, Ohio, has issued a 16-page illustrated catalog dealing with bottle cleaners, tube fillers and sealers, filling machines, and conveyor for use in packaging liquids and viscous materials.

PACKAGING — Use of Cry-O-Vac bag for covering irregular shaped foodstuffs with a close-fitting second skin impervious to passage of water vapor during subsequent freezing and storage as a protection for pork products and for poultry is the subject of Bulletin P 1 and Bulletin C 1, of Dewey & Almy Chemical Co., Cambridge, Mass.

PACKAGING — National Adhesives Division, National Starch Products, Inc., 820 Greenwich St., New York, N. Y., has published a 10-page booklet, "Gluing Transparent Sheetings and Other Facts About Them."

PLASTICS—"New Paths to Profits", 16-page guide to modern plastic materials, published by Bakelite Corp., 247 Park Ave., New York, N. Y., shows various types and colored illustrations of products using Bakelite materials.

SHEETING—Samples of "Inceloid" transparent waterproof sheeting of various colors and types for food packaging, with price list and application data, are included in a booklet by Inceloid Co., Inc., 8127-33 Oleander St., New Orleans, La.

Control Equipment

CONTROL EQUIPMENT—The Bristol Co., Waterbury, Conn., has published the following: Bulletin 512 on coordinated process control; Bulletin 525 on humidity recorders and controllers; Bulletin 528 on strip-chart pyrometers; Bulletin 529 on strip-chart resistance thermometers; and Bulletin 538 on new portable voltmeter.

CONTROL INSTRUMENTS — Boiler room instruments including CO_2 meters, pyrometers, flow meters, level meters, thermometers, pressure gages, and control valves are described in 18-page illustrated Booklet No. 29–31, by The Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

FLOW METER—Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia, Pa., has issued a folder on several styles of electric flow meters for extreme precision in measurement.

PYROMETERS—C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y., has issued Catalog No. 1101 E, entitled, "Pyrometers High Speed Photoelectric Action."

THERMOMETERS—Information on a complete line of industrial thermometers is given in 24-page illustrated Catalog No. 1125C, by C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y.

NEW SPEED ECONOMY THOROUGHNESS in Food Plant Cleaning!

You need a cleaner that wastes no time in getting down to bare metal or other surfaces and removing *all* dirt, grease, oil or process residues.

There is a new, low cost answer to this need—for processing equipment; floors and walls; utensils and tools; interiors of delivery cars and trucks—and all the places where sanitation demands rigid standards of cleanliness.

MAGNUS 1-XD

does a quicker, better job than soap or ordinary cleaners, because it wets and penetrates faster, dispersing dirt of all kinds far more thoroughly. It rinses off quicker and *completely*, leaving a spotless, film-free surface.

Best of all, so little is required to do this thorough cleaning job that your cleaning costs are materially reduced. Magnus 1-XD is the ideal cleaner for Bakeries, Dairies, Chocolate and Cocoa, Candy, Meat Packing and other food processing and packing plants.

There are Magnus Cleaners for your special cleaning problems too—such as angel-food pan cleaning; milk-stone in dairies; can washing in canneries, etc.

LET US SHOW YOU

Put your most pressing cleaning problems up to us and let us show you how Magnus 1-XD or a Magnus Specialty can solve it—safely—satisfactorily—economically.

MAGNUS CHEMICAL CO.

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

107 SOUTH AVE.
GARWOOD, N. J.

Magnus CLEANERS

Food Equipment News

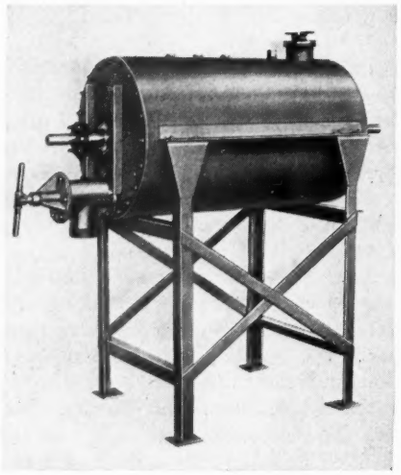
REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Coffee Infuser

COOPERATING with Greenhill Tablepad Co., L. O. Koven & Bro., Inc., Jersey City, N. J., has developed a coffee infuser for the production of concentrated coffee sirup. This device is made of stainless steel clad steel. It has a fully jacketed cylinder and is provided with a horizontal double spiral agitator extending the full length of the inner cylinder. The jacket is designed for use with hot water, so circulated as to maintain a constant temperature in the inner cylinder.

In operation, ground coffee is mixed with the required amount of water and charged into the mixer. The agitator is then started and the coffee and water thoroughly mixed together moving from one end of the cylinder to the other under constant agitation. It is claimed that this infuser will produce a concentrated extract of coffee in much shorter time than other types of equipment developed for the purpose.

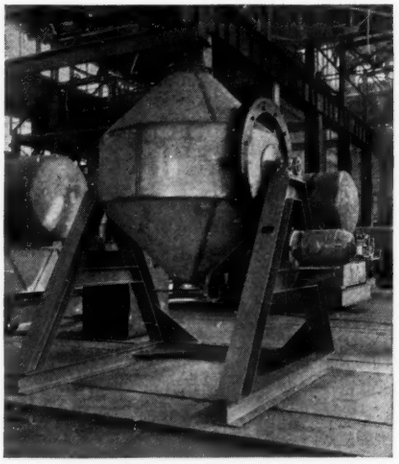
One end of the infuser cylinder is provided with a molded head to provide easy access to the interior for cleaning. Construction is of all-welded type.



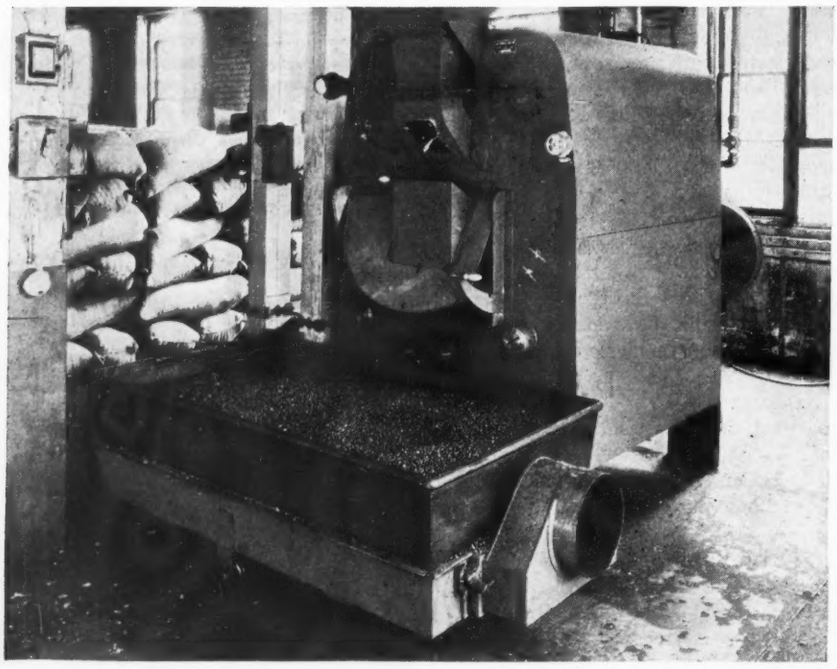
Infusers for the production of concentrated coffee sirup.

Granular Material Blender

BLAW-KNOX, Pittsburgh, Pa., has developed a blender for granular material. This device is conical in form and its rotation develops an appreciable amount of tossing action which insures better mixing than if the action were solely of a rolling character. This tossing motion is also said to prevent separation of different sizes of material into layers or segregated portions. Stainless steel is employed in the construction of this blender in order to keep the product free from contamination. The blender is available in several sizes up to a maximum of 2,000 lb. of dry granular material.



Conical shaped blender for dry granular material.



Batch peanut roaster designed for handling either shelled or unshelled nuts.

Peanut Roaster

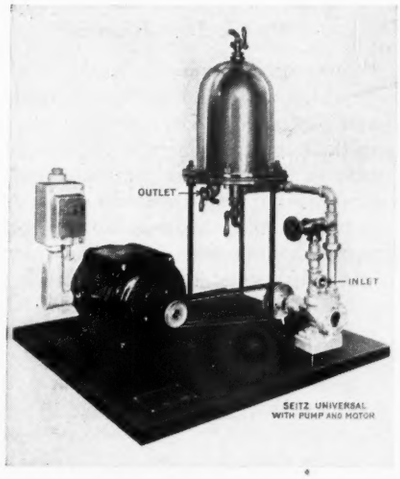
JABEZ BURNS & SONS, INC., 11th Ave. and 43d St., New York, N. Y. are distributing the No. 33 roaster for batch roasting of either shelled or unshelled peanuts. This roaster is similar in design to the same company's well-known "Thermalo" coffee roaster and it is claimed will produce an unusually clean and even roast in the peanuts.

The capacity of the roaster is 1,000 lb. per hr. on peanut butter stock or 600 lb. per hr. on No. 1 Virginia peanuts in the shell. The roaster requires 2 hp. for operation and occupies a space 100 x 52 in. It is designed for heating with any type of gas fuel and is equipped with a "Premix" burner for economic operation.

Small Universal Filter

A SMALL all-purpose filter, Type JG, has been developed by American Seitz Filter Corp., Paterson, N. J. This filter is 7¾ in. high with a diameter at the base of 5½ in. It will handle 100 gal. per hr. of water at 2 or 3 lb. pressure and at 25 lb. pressure it will handle more than 300 gal. per hr. With more viscous liquids the flow, naturally, is slower. With it, filter pressures up to 50 lb. per sq. in. may be used, and it is adaptable to any filterable liquid, with the use of filtering media suited to that particular product. In addition, it can be used for straining viscous liquids when using only the outer screen in a suitable mesh.

This small filter is designed with two concentric mesh cylinders, having a ¾-in. space between. This space is filled with a loose filter media which is solidly packed by means of a wooden tube or form having the same dimensions as the space between the screens. The inlet for liquids is through the inside of the inner screen so that the



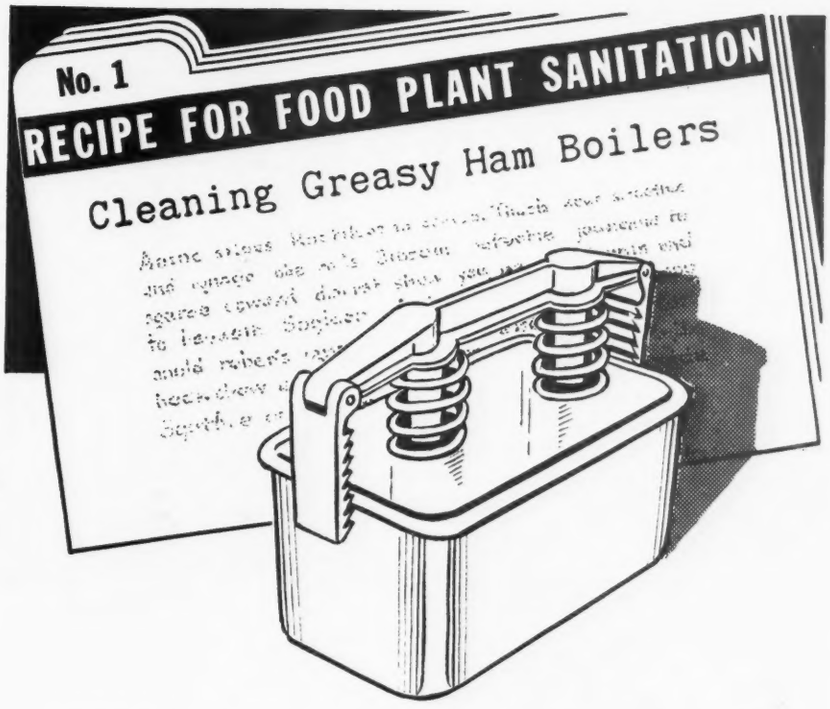
Small universal filter.

liquid is forced through the inner screen, then through the filtering material, and then through the outer screen, whence it collects in the outer shell and passes to the discharge.

Material used in the construction of this filter is ordinarily tinned bronze with Monel metal screens, but these materials can be varied to suit the requirements of the liquid being filtered. In addition to the size above described, larger sizes are available on special order, the diameter being set the same, but the height being increased.

Small Air-Powered Mixer

ECLIPSE AIRBRUSH Co., 390 Park Ave., Newark, N. J., has brought out the type AB Pneumix air-motored



HOW do you clean your ham boilers? Is this job in your plant costing too much . . . is it taking too much time and effort? Would you be interested if you could find a better, faster and SAFE way to clean ham boilers or molds?

Then let us give yau data on how this job can be speeded up . . . how deposits and films of grease and fat can be thoroughly removed from stainless steel and monel metal molds without a lot of brushing . . . how it can be done with complete SAFETY especially if you are using boilers or molds made of aluminum. Long experience in developing successful methods and specially designed Oakite materials for this work have prompted many packing plants to adopt these proved cleaning methods because they save money, turn out a better job and keep cleaning costs low.

On this and other work such as cleaning bacon and meat hooks, hog trolleys, hog gambrels, smoke sticks, meat trucks, pans, pails, floors, etc , you will find that Oakite materials provide the cleanliness and standards of sanitation that invite approval of Government inspectors.

Over 53 Different Oakite Materials Available

Whether in meat packing plants, canning, baking, dairy, bottling, sea food . . . there is an Oakite material and method that will effectively and economically help you to protect product quality, purity and flavor . . help you step up cleaning efficiency.

That's why we say to every food plant executive . . . investigate the advantages and benefits that Oakite materials provide and the competent service that go along with them. Tell us your problem . . . there is no obligation.

Complete Nation-Wide Service For These Industries

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DAIRY
BOTTLING
MEAT PACKING
BAKING
ICE CREAM
SEA FOOD
BREWING
CANNING
CEREAL PRODUCTS

OAKITE *Certified* **CLEANING**

Manufactured only by

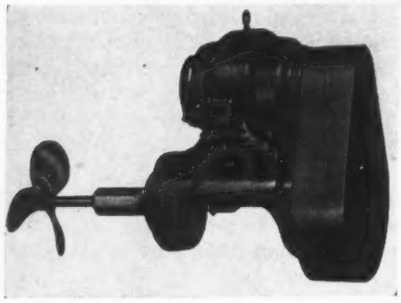
OAKITE PRODUCTS, INC., 26G THAMES ST., NEW YORK, N. Y.

Representatives in All Principal Cities of the United States and Canada

mixer. This is of the clamp-on type direct drive agitator and is designed for use with 5-gal. batches. The speed range is from 300 to 6,000 r.p.m. The machine is provided with a $\frac{3}{8}$-in. chromium plated or stainless steel shaft 12 in. long and has one 3 in. triple blade bronze or stainless propeller. Longer shaft and different propellers can be supplied in any metal desired.

Mixing Unit

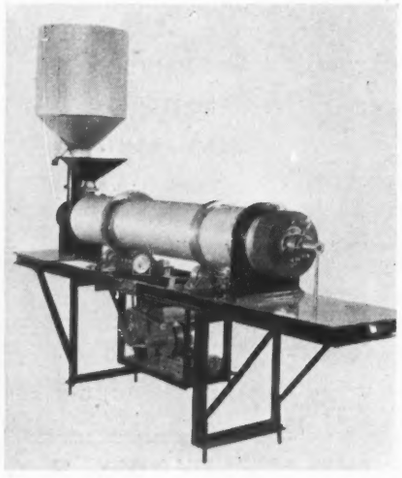
MIXING EQUIPMENT CO., INC., Rochester, N. Y., has recently redesigned its "Lightnin" side entering V-belt mixing unit. In the new design castings have been abandoned in favor of fabricated metal, greatly reducing the weight of the unit and increasing its strength. The motor is now mounted on a pivoted steel platform provided with adjusting bolts permitting the maximum adjustment for belt tension or for replacement of the outboard bearing. The new construction also makes it easier to mount the motor and belt.



New design of side entering mixing unit.

Laboratory-size Dryer

INTEREST IN DRYING and dehydration of food products has led to the development of a miniature rotary steam tube dryer, for experimental or pilot-size operations, by Louisville Drying Machinery Co., Louisville, Ky. This machine is an exact replica of the full-size machines of the same type built by this company.



Laboratory-size rotary steam tube dryer.

Loaded and unloaded "Mobilift" gasoline factory trucks in operation in a canning plant.

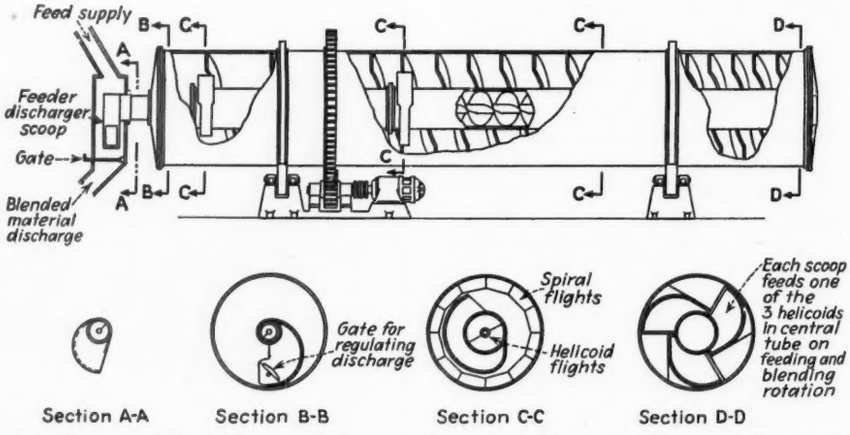
Gasoline Factory Truck

VAUGHN MOTOR CO., 835 S. E. Main St., Portland, Ore., is manufacturing the "Mobilift," a lightweight lift truck for handling loads around the plant. This truck has a capacity up to 2,000 lb. and is powered with a 6 hp. gasoline engine. Drive is through the two forward wheels which are large in diameter and steering is through a smaller single wheel in the rear. The turning radius is 50 in. and the lifting height is 9 ft. Depending upon the service for which the truck is to be used, several styles of lift and carry equipment are available with this truck and specially designed large-load arms for heavy loads have been developed.

Triplex Dry Blender

PATTERSON FOUNDRY & MACHINE CO., East Liverpool, Ohio, has developed a triplex dry blender, which is shown in the accompanying sketch. The feature of this blender is the division of the material into thirds by geometric progression, in addition to which the material undergoes the conventional mixing process during its travel.

Material is fed to the blender at the left, entering a single helacoid screw flight passing to the outer shell. It travels one-third of the length of the blender, then entering a double helacoid screw flight, thus being divided into two distinct streams. When the final third of the blender is reached, the material enters a triple helacoid



Triplex type of dry blender, said to provide for complete uniformity of mixture of dry materials.

screw flight, dividing it into three distinct streams.

Each of the three compartments of the outer cylinder is equipped with individual scoops which pick up one-third of the material and deposit it in the inner cylinder. Again it is divided into two sections, traveling left toward the starting point the length of one compartment, where one stream is permitted to return to the outer cylinder and a double stream carried through a second compartment. Another stream is dropped at the end of the second compartment and the third near the feed end of the machine. This action is said to result in mechanical division into exact thirds, and because of this the mixing proceeds rapidly, four cycles causing approximately 81 divisions and practically complete mixing. One cycle averages about 15 revolutions of the blender.

Fruit Sirup Mixer

In the accompanying photograph is shown a new fruit juice sirup mixer recently constructed by L. O. Koven & Bro., Inc., Jersey City, N. J. This mixer is designed to disperse thoroughly fruit pulp in the sirup and to maintain its dispersion while the sirup is being drawn off. It is constructed of material that will resist the action of fruit acid in order to eliminate the possibility of corrosion or metallic contamination.

In this design, the bottom support for the agitator shaft is arranged in the form of four arms, bolted to

Mixer for fruit juice sirup.

bosses welded to the tank bottom. This is in order to leave the center discharge opening completely free for quick discharge and easy cleaning. The bottom of the mixer tank is dished to facilitate thorough emptying. Agitator blades are set at 45-deg. angles to the horizontal plane, for rapid mixing. The whole device is 54 in. in diameter and 54 in. high, but can be supplied in other sizes as required.

Deaerator for Liquid Products

THERMAL RESEARCH CORP., Richmond, Va., has developed the "Micro-Film" deaerator for removal of air from bottled or canned liquid products. This device operates by subjecting the liquid to high vacuum, causing a portion of it to "flash" into vapor. This results in forcing both dissolved and occluded gases out of the liquid, provided that sufficient time and surface contact between liquid and vapor are available for the establishment of equilibrium.

In operation, the incoming liquid is forced into films which are caused to strike the interior surface of the deaerator under a high vacuum produced by steam jets. The combination of large liquid surface, high vacuum and high velocity impingement provides for instantaneous gas removal. The temperature drop (the

★ Cercon is an edible, tasteless wax suitable for coating food products requiring protection from the air.

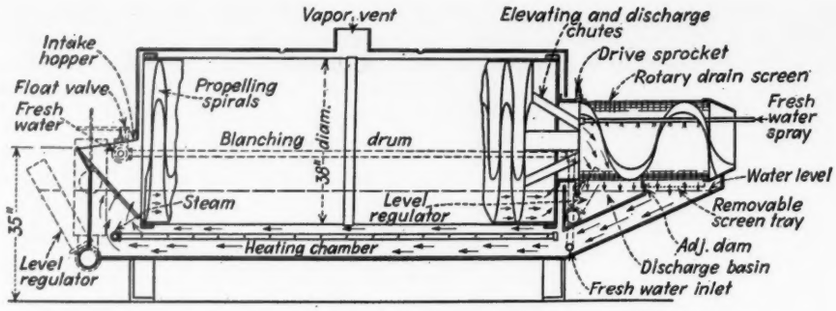
It is supplied in six colors—Snowdrift, Lemon, Orange, Tangerine, Apricot, and Olive. It has an ASTM penetration of 50 with the 50 gram weight attached.

We will be very glad to send test samples to any interested company.

THE CONEWANGO REFINING CO.
WARREN, PENNSYLVANIA

amount of "flash") depends on the products, with a drop of 5 to 10 deg. F. being sufficient for ordinary fruit juices.

This deaerator is claimed to remove up to 99 per cent of both dissolved and occluded gases, without excessive foaming. Its control is automatic, with no moving parts. Construction is of stainless steel.



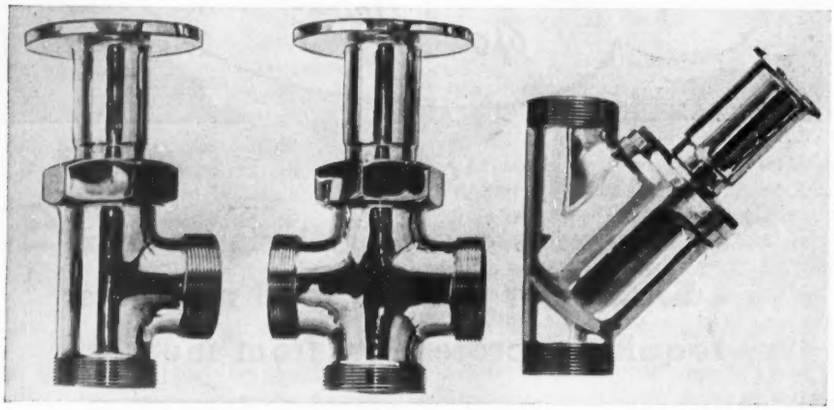
New type of rotary blancher providing positively controlled blanch.

Control Instrument

For such industrial applications as checking the purity of water, determining acidity or alkalinity, and determining ash content, Industrial Instruments, Inc., 162 W. 23rd St., Bayonne, N. J., has developed its Model RC conductivity bridge. This instrument is an adaptation of the Wheatstone bridge and operates from 110 or 220 volt power lines. It is a portable self-contained instrument which can be used at any desired point.

Sanitary Stainless Steel Valve

Tri-Clover Machine Co., Kenosha, Wis., is marketing a new line of sanitary stainless steel valves, Types 607 Y and C. These valves have been designed so that no sticking or gumming can occur and so that there are no inside pockets or threads to prevent completion sanitation.



Sanitary stainless steel valve.

Bread Slicing Machine

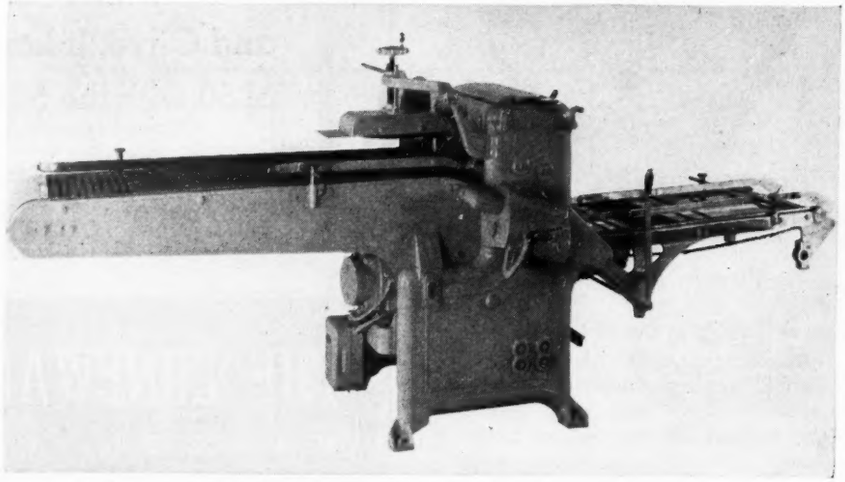
Oliver Machinery Co., Grand Rapids, Mich., is making the "Mercury" bread-slicer, a heavy-duty, high production slicer. This slicer is designed in accordance with the Fritz patents for progressive step cutting of the bread. Among the features of this slicer are a feed control unit to positively control the speed of the feed conveyor and synchronize the slicing machine with the wrapping machine. Another feature is a slice discharge conveyor designed to compensate for variations in the width of the loaves of bread, and by means of lightly knurled revolving slice bars to accurately time and space each loaf.

A synchronized loaf-feeder is embodied in this slicer, consisting of a long traveling belt feeding the loaves continuously into the slicer knives while above the loaves is a synchronized upper traveling mat, making top contact and traveling at exactly the same rate of speed as the lower belt. These two conveyors prevent any crushing of the loaves during feeding and assure a continuous flow of bread through the slicing knives.

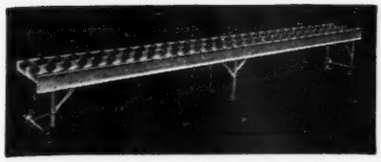
In the design of the new cutter provision has been made for interchangeability of all parts which may need renewal, including the knife blades. The slicer is available in two widths, 17 and 24 in., will slice loaves from 4 to 24 in. in length, 3 to 8 in. in width, and up to 6¼ in. in height.

Sanitary Rotary Blancher

Chisholm-Ryder Co., Inc., Niagara Falls, N. Y., has developed the new rotary blancher shown in cross-section in the accompanying sketch. The operation of the blancher will be evident from the sketch. Manufacturer claims for it the following advantages: Complete sanitation, economical use of water and steam, positive control of materials passing through, no crushing or damage to even the tenderest product, the improved color and flavor of products, control of blanching water used or re-used, provision for draining blanched materials and rinsing if desired, great capacity in minimum floor space, strong construction ot all parts, low intake pipe and convenient discharge pipe, and easy access for cleaning. This blancher is available in four sizes with respective maximum blanching time of four, eight, twelve and fifteen minutes.



"Mercury" heavy-duty bread-slicing machine.



Portable wheel conveyor.

Wheel Type Conveyor

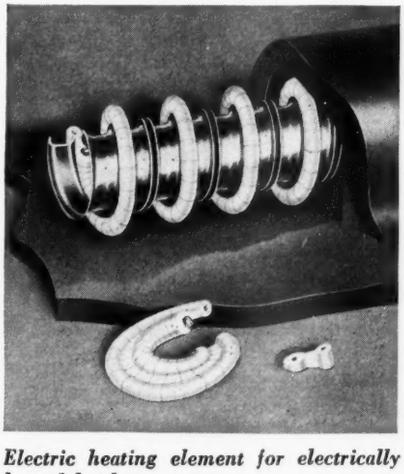
A WHEEL or roller type portable conveyor made of aluminum, for high strength combined with light weight, has been placed on the market by Aluminum Ladder Co., Tarentum, Pa. This conveyor is equipped with pivoted steel ball bearing wheels at each end of the section so that when the wheels are in a down position the conveyor can be moved from place to place and when the wheels are in an up position, the conveyor rests firmly on the floor. A 10-ft. section, 14 in. wide, weighs only 60 lb. Other widths, lengths and weights are available.

Another advantage of the aluminum metal used in this construction is its freedom from corrosion and its ease of cleaning.

Heating Element for Electrically Heating Kettles

PATTERSON FOUNDRY & MACHINE Co., East Liverpool, Ohio, has developed an electric heating element known as the "Flasheat" element for use with electrically heated kettles and other heating apparatus.

Among the claims made by the manufacturers for this new element are more rapid heating up; more heat concentration per unit area; rapid water cooling; higher efficiency and longer life. The element has been designed to withstand wear and so that it can be immediately replaced without removal of the insulating jacket. It can be applied to any shape of kettle or heated apparatus without preforming.



Electric heating element for electrically heated kettles.

Duct Fan for High Temperatures

HARTZELL PROPELLER FAN Co., Piqua, Ohio, has developed a propeller type fan blower in which the motor is located on top of the blower housing so that it is entirely out of the air stream. The purpose of this blower is to meet the demand for a propeller type fan to be used in moving air at high temperatures or where acids or other vapors might damage the motor.

Motor mounting consists of a platform on top of the blower housing. One side of this platform is hinged and lock bolts on the opposite side can be adjusted to tighten or loosen the belt. The drive is by means of a V-belt, which can be replaced from outside the lower housing and which is protected on the inside by steel guards.

This new fan blower is made in twelve sizes with propellers from 18 to 48 in. in length.

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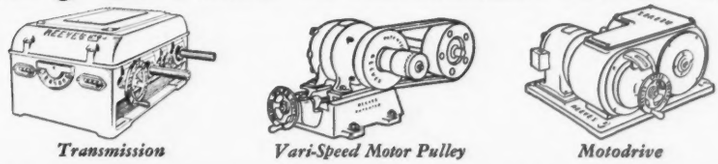

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Food Technology

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FOOD TECHNOLOGY

Pectin-Nickel Bactericide

PECTIN becomes readily dispersible in water or fruit juices when it is combined with about 0.1 to 1.0 (by weight) of nickel. As described in Canadian Patent 385,242 (granted Nov. 21, 1939, to Philip B. Myers and assigned to Sardik, Inc., Jersey City, N. J.) pectin is caused to react in aqueous solution with a soluble nickel salt and the product is dewatered and dried. The resulting powder can be readily dispersed again in water or in fruit juices and has the special merit of acting as a bactericide.

Similar easily dispersible colloidal preparations, serving as bactericides in water or juices, can be made by reacting pectin with a salt of lead, copper, manganese, cobalt, zinc or silver. In each case the proportion of metal used is insufficient to coagulate the pectin, so that the product can be dispersed in the liquid to be treated.

Testing Bottle Washing Solutions

THE STERILITY of milk bottles depends upon the correct combination of temperature, strength of cleaning solution and soaking time; the germicidal efficiency increases with amount of free caustic, time of contact and rinsing temperature. Whereas time and temperature are easily kept constant, a regular daily control must determine the additional amount of cleaning compound required from time to time to maintain the caustic concentration at a definite level established to guarantee sterilization under plant conditions.

Of the three methods now widely used for determining germicidal power in cleaning solutions, only the test for total causticity meets all requirements. Hydrometers, based on specific gravity of the solution exclusively, register only changes in concentration regardless of cause.

Although frequently expressed as "caustic equivalent," the total titratable alkalinity indicates only the acid neutralizing value of solution which, in itself, is no index of sterilizing power.

The test for total or free causticity alone provides a direct relationship between the result and the ability of the solution to destroy bacteria, mold or yeast. It does this without regard to other alkalis present in commercial compounds for quicker solution of dirt, free rinsing, etc. Total causticity is obtained by titration to the phenolphthalein end point, after transforming all noncaustic alkalis into insoluble barium salts by means of barium chloride, or by double titration using first phenolphthalein and then methyl orange as indicators. The difference between the first and second reading gives the amount of free caustic present in the solution.

Two tests suggested more recently, based on pH or electrical conductivity of the solution, give no satisfactory results in the opinion of the author.

The value of the pH test is questioned on the basis of involving a more complicated procedure, variation in effect of pH with different microorganisms encountered and materials used, as well as failure to indicate "reserve strength"; whereas the conductivity test is ruled out because of the only indirect relationship between conductivity and sterilizing capacity.

Digest from "Testing Bottle Washing Solutions," by C. M. Moore, *Journal of Milk Technology* **2**, 227, 1939.

BAKING

Baking Quality of Wheat Improves on Storage

BAKING QUALITY of flour appears to depend a great deal upon the viability of the wheat at the time of milling. The average germinating energy increases with storage, a maximum being reached approximately three and one-half months after harvesting. As the wheat matures its baking quality improves, although the loaf volume remains practically constant during the first six months. The best bread is produced when the wheat is about three months old, this storage period coinciding with maximum dough absorption and greatest germinating capacity. However, since the differences in baking quality are not very distinct, the potential baking value of wheat can be determined by the experimental baking test almost immediately after harvest, if the grain had matured properly before cutting.

Digest from "Variation in the Baking Quality of Wheat During Storage," by J. A. Shellenberger, *Cereal Chemistry* **16**, 676, 1939.

Dough Properties During Baking Determine Bread Character

CHANGES IN DOUGH COMPOSITION or handling that affect gas production, produce differences in oven spring which become apparent at once upon heating, while those changes which increase gas retention give oven spring characteristics that appear later in the baking period. These facts were established by means of the improved model of the experimental baking pan designed by Baker and Mize in which bread dough is baked by the temperature increase due to resistance to passage of an electric current without forming a crust. Uniform rise in temperature is achieved by applying a constant wattage to the dough. The voltage required varies with the composition and volume of the dough, hydration of the ingredients, salt content, absorption, temperature and other factors affecting dough electrical resistance. In doughs of similar composition, except for fermentation or oxidation, differences in voltage are caused chiefly by changes in volume and hydration. The rate of voltage rise is a measure of volume, because the straight electrode walls prevent dough expansion in other directions during oven spring.

While the voltage is inversely indicative of dough conductivity, its plastic properties are determined by a weight passing through the dough while heating. A manometer under the dough records changes in pressure within the dough structure. Desirable doughs develop high pressures in the proof.

Well oxidized, no-time doughs, made without any, or with 3 per cent liquid shortening, show a softening effect during baking, accompanied by a drop in pressure and the stopping of oven spring. Doughs with 3 per cent semi-solid shortenings, on the contrary, show no reduction in pressure. This difference in behavior indicates

that the first two doughs may become porous, allowing the gas to escape during the softening period, while the third dough retains the gas much longer.

Digest from "Effect of Temperature on Dough Properties," by J. C. Baker and M. D. Mize, *Cereal Chemistry*, 16, 682, 1939.

BEVERAGES

Vitaminized Malted Beverages

ADDITION of generally used commercial vitamin D concentrates to beer, ale, porter, and stout has been complicated by the oily characteristics of these concentrates. Presence of these concentrates diminished or prevented the formation of a foam or "head" on these beverages when run into serving glasses and interfered with consumer demand for malted beverages containing them.

By irradiating ergosterol in an anhydrous ethyl ether solution and recovering the resulting vitamin D in 90 per cent ethyl alcohol under CO_2 protection, the oily vitamin D carrier is eliminated. The solution may be diluted by addition of 90 per cent alcohol to give it a vitamin D content of 20,000 U.S.P.X. units per cc. and held as a standard stock solution for addition to the beverage during time of storage or just before filling into kegs, bottles, or cans. Each 12 oz. of the beverage is made to contain 100 U.S.P.X. units of vitamin D.

The procedure of making vitaminized malted beverages by this method is covered by U. S. Patent No. 2,175,340, granted to Jacques W. D. Chesney and assigned to New Discoveries, Inc., Chicago, Ill.

Compressed Carbon Dioxide To Preserve Fruit Juices

NUMEROUS TESTS were made with apple and pear "ciders" and with grape juice to ascertain the actual efficiency of carbon dioxide under pressure as a preservative for unfermented fruit juices. A few tests were made with raw juices for comparison, but the general procedure was to sterilize the juice, inoculate with a known quantity of a pure yeast strain, and then store samples under various pressures of carbon dioxide.

While the actual carbon dioxide pressure in the storage container may be considered the main factor in permitting or preventing fermentation, it is impossible to state any definite minimum pressure which must be applied to prevent fermentation. The solubility of carbon dioxide in the juice, the temperature and the yeast concentration are also factors in the final result. Contrary to the popular opinion that 7 atmospheres pressure will prevent fermentation in a juice saturated with carbon dioxide, as high as 20 atmospheres may be needed in unfavorable cases, for example when the yeast cell count is high and the storage room is warm. This is a little less than the self-generated carbon dioxide pressure required to halt fermentation in a fermenting juice in a sealed vessel.

It has been suggested that partly fermented fruit beverages could be produced by allowing fermentation to proceed in this way until halted by the self-generated pressure, followed by clarifying the product by ultrafiltration. But such a process would not be feasible unless the lactic acid bacteria are first removed or destroyed, since their activity is not halted by carbon dioxide under pressure.

Comparative tests with air and oxygen under pressure, instead of carbon dioxide, gave some evidence that pressure alone can inhibit yeast fermentation to some extent, but the

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evidence is not yet conclusive and additional tests are needed to settle this question.

Digest from "Scientific Principles of Storing Unfermented Fruit Juices Under Carbon Dioxide Pressure," by A. Oatenvalder and J. Jenny, *Landwirtschaftliches Jahrbuch der Schweiz* 53, 370, 1939 (Published in Switzerland).

CANNING & PRESERVING

Yellow Deposits in Green Asparagus—Harmless

YELLOW, crystalline deposits frequently encountered in home-canned green asparagus appear to result from the extraction of a flavone or flavone derivative during heat processing with subsequent crystallization when the liquid cools to atmospheric temperatures. The rather rare occurrence of this sediment in the commercially-canned vegetable is probably due to the fact that in this case young asparagus is processed immediately, whereas in home-canning the asparagus may be harvested at a later stage or may be held for some time before processing. During this time changes in chemical composition may occur. There is no reason to believe that this material has any significance from the public health standpoint.

Digest from "Nature of a Yellow Deposit in Jars of Home-Canned Green Asparagus," by H. Campbell, *Food Research* 4, 397, 1939.

DAIRY PRODUCTS

Better Bacterial Control In Swiss Cheese

SOME SWISS CHEESE MAKERS regularly inoculate Emmenthal cheese with propionic acid bacteria, sometimes to excess. Others depend on nature, and their product is sometimes impaired in quality by a deficiency of propionic acid fermentation.

The best procedure is neither to rely entirely on nature nor to inoculate all batches alike, but to subject every batch to a specific bacterial count and then to inoculate, or not, with a pure culture of propionic acid bacteria, according to the result of the count. The Dorner method of making the bacterial count is convenient for control work in cheese making.

Digest from "Propionic Acid Bacteria in 24-Hour Emmenthal Cheese," by W. Dorner and W. Mosimann, *Landwirtschaftliches Jahrbuch der Schweiz* 53, 281, 1939 (Published in Switzerland).

How to Improve Cream Body —Legally

THE BODY (viscosity) of cooled pasteurized cream can be increased by immediately rewarming to 86 deg. F. in 20-25 minutes, vat cooling down to 65 deg. in 12-15 minutes, followed by surface cooling to 45 deg. The increased body as measured by a flow type viscosimeter may amount to nearly 300 per cent. The process is patented (U.S.P. 2,092,325). By studying artificial creams made from butter oil and various ingredients of skim milk, it was found that presence of the membrane which surrounds the fat in normal cream is essential for success in this "rebodying" process. If this is present, the other constituents of skim milk, particularly the lactalbumen, help increase the body still further.

Digest from "Improvement in the Viscosity of Pasteurized Cream through Subsequent Heat Treatment," by Hilda F. Wiese, J. H. Nair, and R. S. Fleming, *Journal of Dairy Science*, 22, 875, 1939.

Sweetened Cocoa Powder Soluble in Cold Milk

DISSOLVING SWEETENED COCOA or chocolate powders in cool or cold milk is usually difficult without aid of vigorous mechanical agitation.

To overcome this difficulty and give a powder which can be stirred in easily with a spoon, U. S. Patent No. 2,179,-130 specifies the following procedure.

Add 50 lb. water to 100 lb. high purity crystalline dextrose in a closed, jacketed kettle and heat with stirring until a temperature of 230 to 280 deg. F., preferably 240 deg. F., is reached for the removal of excess water.

By pouring the hot sirup into a hot steam jacketed mixer upon 25 lb. of cocoa powder and mixing at the hot sirup temperature, the cocoa particles are partially gelatinized and covered with a sirup coating. When the steam has been turned off and mass cooled to about 180 deg. F., flavoring such as vanillin is added and mixed into the mass preliminary to emptying into sugar pans where crystallization of the sugar entraps the cocoa particles.

After 24 to 48 hours, the solid cakes are broken up and ground until all particles will pass through a 30 mesh or finer screen. The resulting powder will contain about 3 to 5 per cent moisture but will not become sticky or cake and will contain about 1 part cocoa to 4 parts dextrose.

If sucrose or maltose is made a part of the sugar content, a reduction in sugar ratio will have to be made to get the same level of sweetness as given by the dextrose. Should a product of high sweetness be wanted a product having the ratio of 1 part cocoa to 9 parts sugar can be satisfactorily made by the same procedure, according to the provisions of the patent granted Herbert T. Middleton, Englewood, N. J., and assigned to Corn Products Refining Co., New York, N. Y.

DEHYDRATED PRODUCTS

Vitamin C Losses in Potato Dehydration

VITAMIN C is irregularly distributed in potato tubers, but in general it is least concentrated at the hilum, more so at the crown, and usually still more so in the intervening zone. The interior of the tuber is richer in vitamin C than the periphery. Hence the loss due to peeling is small since the peel and the immediately adjacent tissues are poor in vitamin C.

In the commercial preparation of dried potatoes there is a loss of vitamin C potency, but it cannot be attributed to peeling. Losses arising from operations involved in preparing and drying the tubers should be studied. Potassium ferricyanide test paper can be used in a convenient method for detecting vitamin C and studying its distribution in potato tissues.

Digest from "Distribution of Vitamin C in Potatoes and its Significance in Drying Potatoes for Use as Food," by W. Kröner and W. Völksen, *Zeitschrift für Spiritusindustrie* 62, 11, 19, 1939 (Published in Germany).

FATS AND OILS

Synthetic Fats

GERMAN PROGRESS in synthesizing edible fats is disclosed in British Patent 506,092 (granted May 23, 1939, to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-am-Main, Germany). Paraffin hydrocarbons, such as may be obtained from petroleum or coal tar oils or from the catalytic reactions used in making synthetic gasoline, are oxidized under controlled conditions, below 285 deg. F., then refined by vacuum distillation to remove components in which the carbon chain is too long or too short. The fatty acids, thus prepared and purified, are esterified with glycerin which may be synthetic or may be derived from natural fats in soap manufacture or other industrial processes.

Edible oils and fats can be produced in this way, and they can be modified in a great variety of ways by interaction with natural oils or fats, in presence of free (natural or synthetic) fatty acids or of free glycerin so that mixed glycerides are formed. The products can also be hydrogenated with the aid of a nickel catalyst, as is done in hardening oils. For special food products, the synthetic fats may be fortified with vitamins or vitamin-rich substances.

Stabilizing Shortening

HYDROGENATED, deodorized cottonseed oil shortening, may be given increased keeping time and lowered peroxide values, if treated with small amounts of $NaHSO_3$ (either the dry powder or a saturated solution). The flavor of the treated shortening will be good if not too much bisulphite is used. The shortening so treated will contain a very small amount of SO_2.

(Editorial Note—The authors do not discuss the problem of labeling such materials nor whether the use of this stabilizing chemical would be regarded under the Food and Drug Act as the addition of a preservative. Those considering this scientific report will presumably wish to take account of that consideration if their interest relates to foods.)

Digest from "Sodium Bisulphite as a Stabilizer for Hydrogenated Cottonseed Oil Shortening," by K. S. Hoover and H. E. Moore, Capital City Products Co., Columbus, Ohio, *Oil and Soap*, 16, 212-214, November, 1939.

GRAIN PRODUCTS

Moisture and Temperature Affect Quality of Milling Products

PHYSICAL PROPERTIES, as well as germination and respiration in the wheat kernel, are influenced by temperature in conjunction with moisture content. Respiration intensity of wheat is extremely weak at a moisture content of 10 per cent; at 14 per cent it is more distinct, increasing rapidly thereafter. In dry wheat, practically no respiration takes place at 0 deg. C.; at 10 deg. C. it is still insignificant. Although it increases more and more at rising temperatures, it does not increase parallel to the influence of increasing moisture content. These two factors deserve more attention during storage. Moisture content apparently is primarily responsible for physical changes in the grain, whereas the temperature affects more its chemical composition.

There seems to exist a definite relation between moisture absorption and the hardness of the kernels, necessitating different amounts of moisture to attain the most favorable milling conditions for different wheats. Regardless of the initial hardness, this factor decreases rather uniformly with increasing moisture content.

Moisture absorption is accelerated by heat. The influence of higher temperatures differs fundamentally with the moisture content. The acrospire is first in absorption capacity, followed by the inner layer of the hull (aleurone cells), then the outer layer (cellulose fiber) and finally the endosperm. The absorption capacity of milled products depends upon the percentage of hull particles on one hand and on the fineness of the grist on the other, finer particles being more absorbent than coarser ones.

The moisture content of milling products depends primarily on the moisture content of the wheat and secondarily upon milling procedure. Variations in the moisture content of milling products influence the character and baking quality of the flour. The most favorable condition appears to be provided at a relative humidity of 60 to 65 per cent.

Digest from "The Influence of Humidity and Temperature on Wheat and Its Milling Products," by G. Brückner, presented at the Sixth International Congress of Technology and Chemistry of Agricultural Industries, Budapest, 1939. [Proceedings, Vol. I, p. 445]

Vacuum Conditioner Improves Flour Milling

THE HIGH STATUS of present milling technology leaves little room for improvement in actual milling operations. Efforts for further perfection

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For headroom saving of minor proportions, the Clevis Type Hoist is suggested. This hoist saves from 3 to 16 inches depending on the capacity involved. Should this prove inadequate, the Trolley Type Hoist should next claim your attention. This will save from 8¾" to 2' 3" according to capacity. In the event that a still greater saving is required, Yale has developed a hoist that will settle practically all headroom problems—the Rail Hugger. **Providing the shortest headroom available in any hand hoist,** it will save from 18" to 5' 1" depending on capacity. It's Headroom Saver No. 1!

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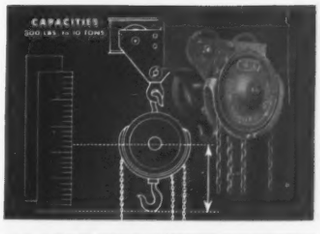

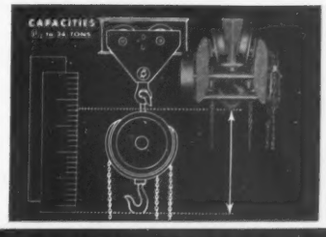

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are directed toward a more complete separation of the hull and endosperm through (1) more suitable conditioning of the grain and (2) better dehulling methods. Millability and baking quality of soft wheats can be improved by steeping the wheat to a moisture content of 25 per cent, which is reduced by 8 per cent in less than one hour at 50 to 60 deg. C. in the wheat. This is best accomplished in a vacuum conditioner, vacuum drying of grain principally being a function of relative vapor pressure between the kernel and the vacuum. Vacuum drying is also more economical, as it involves drying at low temperatures and at the same time exerts a more uniform drying effect.

The total heating surface, located directly in the grain stream, is subdivided into several independently heated elements. In turn, each heating element consists of a great many small, oval heating pipes arranged parallel beside each other and reversed above each other, thus forcing each kernel into the action radius of most intensive heat.

The introduction of the wet dehulling process, with 6 to 8 per cent water at 50 deg. C., results in more complete removal of the hull and a simultaneous increase in flour yield of 4 to 5 per cent improved baking quality.

Digest from "Influence of Humidity and Temperature of the Air and of the Grain on the Milling Products of Wheat," by K. Mohs, presented at the Sixth International Congress of Technology and Chemistry of Agricultural Industries, Budapest, 1939. [Proceedings, Vol. I, p. 413]

Oat Malt Retards Spoilage in Clear Flours

ADDITIONS of small amounts of malted oat flour to hard wheat clear flours can be made to serve effectively the dual purpose of enhancing the diastatic activity of the clear flour and simultaneously reducing the deleterious effects of storage oxidation. During the first few months of storage, malted oat flour does not differ markedly from malted wheat flour in its action as a diastatic supplement. Following four months of storage, malted oat flour seems to exert some influence toward decreasing the rate of deterioration in the flour.

Digest from "The Effects of Small Quantities of Malted Oat Flour on the Keeping Quality of Wheat Flour," by J. A. Shellenberger, *Cereal Chemistry* 16, 671, 1939.

MEAT PRODUCTS

How to Determine Soya Bean Flour in Sausage

AT PRESENT, the use of soya bean flour in meat products in restricted to intra-state business. Federal regulations of the Bureau of Animal Industry do not permit this binder because no quantitative method exists to determine the amounts employed. Many local inspection agencies have also adopted this rule. Effective qualitative tests facilitate the enforcement of these prohibitions.

A recently developed method of quantitative analysis is based on carbohydrate hydrolysis of reducing sugars and their determination with Fehling's solution. This procedure has been made specific by taking into account the particular nature of the carbohydrate of soya bean flour and basing the determination on insoluble, non-fermentable sugars present. A quick and convenient fermentation technic is used, which eliminates interference from other soluble carbohydrates likely to be present. The results appear to be sufficiently accurate for control purposes.

Digest from "Determination of Soybean Flour in Sausage by Nonfermentable Sugars," by W. B. Hendrey, *Industrial and Engineering Chemistry, Analytical Edition*, 31, 611, 1939.

Plumpness of Ham Indicates Quality

CONSUMER PREFERENCE for relatively short, plump, well-muscled hams having a moderately thick covering of external fat and a high proportion of edible meat instigated a study by the Bureau of Animal Industry to determine the relationship of anatomical factors to this conformation and to establish their scientific and practical significance. Plumpness increases as the type of hog changes from large to small. With these changes, coincide increases in the percentage of separable fat and total edible portion, also decreases in separable lean and skin and bone of the ham, the most striking variations occurring in the proportion of fat.

No increase in the average weight was found with hams of different plumpness, neither was there a consistent increase or decrease in the weight of the different muscles. However, the percentage of separable fat and total edible meat increased with increasing plumpness, whereas the percentage of lean decreased slightly. The percentage of the separable fat was most closely related to plumpness; it is also closely related to the thickness of ham fat and less closely to the ratio of edible to inedible portion of the ham. A noteworthy, inverse relationship exists between the separable fat and lean. Variations in ham conformation appear to be due more to combinations of certain factors than to individual factors, but the percentage of fat had a greater effect than any other characteristic.

Weight proved to be of little value as an indicator of the proportion of edible meat, plumpness being a better index for this purpose.

Digest from "Significance of Variation in Ham Conformation," by R. L. Hiner and O. G. Hankins, *Journal of Agricultural Research* 59, 293, 1939.

SUGAR

High Temperature Centrifuging Cuts Sugar Refining Costs

INCREASED YIELD and quality of crystals from a vacuum pan charge, increased production capacity of centrifugals, and improved utilization of wash liquors are claimed for the rapid and high temperature method of recovering sugar crystals described in U. S. Patent No. 2,175,996.

As explained by the patentee, Eugene Roberts, Hastings, N. Y., the sugar sirup, prepared from beets or cane and clarified in the regular manner, is concentrated in the vacuum pan, preferably at 180 to 190 deg. F., to give a massecuite density equivalent to a dry solid content as high as 93 per cent and a crystal content of more than 50 per cent.

From the vacuum pan the charge is dropped into a mixer equipped with an agitator and a revolving heated coil which keeps the massecuite at vacuum pan temperature until fed into a 40-in. centrifuge operating at an accelerated rate of speed during loading.

By loading the centrifuge while its speed of rotation is accelerating from between 300 and 700 r.p.m. to attain a speed of 1,250 r.p.m. in less than 40 sec., 90 per cent of the mother liquor is separated from the crystals before it has time to cool and stiffen and cause a packing of the crystals and entrapped liquor to make difficult subsequent washing of the crystals.

Washing with water at 185 to 195 deg. F. under 30 lb. per sq. in. nozzle pressure begins when the centrifuge has reached the speed of 1,250 r.p.m. and continues for 10 to 25 sec. depending upon the fineness of the sugar crystals; 6 to 16 qt. of water is used. After washing, the centrifuge runs at the high speed for 10 to 40 sec. when the crystals containing about 1 per cent moisture are dumped onto a conveyor to be further dried and cooled in unheated air with the development of a high brilliancy.

By this method, the production rate increase at the centrifuge is given as 15 per cent, in addition to a higher recovery of crystals from a vacuum pan charge and 100 per cent recovery of the reduced volume of wash liquor. Assignment of patent is made to Western States Machine Co., New York, N. Y.

Formulas for Foods

FORMULA NO. 31

Coconut Cream Pie

Milk..... **3 qts.**
Sugar (sucrose)..... **1 lb.**

Set on fire, and let come to boil. In the meantime, mix together:

Salt..... **1 teaspoon full**
Sugar (sucrose)..... **1¼ lb.**
Cornstarch..... **6½ oz.**
Eggs..... **9**
Vanilla Extract..... **½ oz.**
Coconut, shredded..... **12 oz.**

When the milk and sugar reaches the boiling point, stir in the mixture of sugar, cornstarch, salt and eggs. Cook until thick. (All ingredients may, however, be mixed together and cooked in a steam jacket kettle.)

After the custard is cooked, add ½ oz. of vanilla extract and 12 oz. of good quality shredded coconut.

Fill the custard into baked pie shells and top with the following meringue:

Egg white..... **1 qt.**
Sugar (granulated sucrose). **3 lb.**

Spread the meringue on the tops of filled pies, roughly. Then sprinkle with shredded coconut.

Yield 12—9-in. pies.

Formula from General Foods Corporation

FORMULA NO. 32

New England Style Pressed Ham

Blade meat (cut 1 to 2 in. square)..... **70 lb.**
Bull meat (cut fine in silent cutter)..... **25 lb.**
Dry milk solids..... **3½ lb.**

Cure blade meat at the rate of 2½ lb. salt, 3½ oz. sodium nitrate and 2 lb. dextrose (corn sugar) to 100 lb. blade meat for five days.

Use fresh bull meat. While chopping add 1 qt. of quick cure (Formula 23), ice and dry milk solids. Cut fine. Place blade meat and bull meat in mixer and mix well.

Stuff in artificial casing or beef bungs. Smoke and cook in usual manner.

See also general directions for sausage manufacture (Formula No. 22).

Formula from Dry Milk Institute

FORMULA NO. 33

Frappe

Unit	Ingredients	Test Batch	Production Batch
A	**Egg Albumen**	1½ oz.	1 lb.
	Water	3 oz.	2 lb.
B	**Sugar**	1 lb.	10 lb.
	Invert sugar	1 lb.	10 lb.
	Corn sirup	3 lb.	30 lb.
	Starch	1½ oz.	1 lb.
	Water	6½ oz.	2 qt.

Method

Dissolve egg albumen in the water. Place in beating machine and add B when it has cooled to around 130 deg. F.

Mix ingredients (B) in kettle. Bring to boil, wash down sides of kettle. Cook batch to 230 deg. F. Shut off heat. Allow to cool to around 130 deg. F., then add to A and beat until a light marshmallow-like mass has been reached.

If sirup is added too hot, the egg albumen will coagulate.

FORMULA NO. 34

Caramels for Wrapping or Pan Caramels

Unit	Ingredients	Test Batch	Production Batch
A	**Sugar (granulated)**	1 lb.	15 lb.
	Dry milk solids [1]	7½ oz.	7 lb.
	Stabilizer	1 gram	½ oz.
	Water	12 oz.	10 lb.
	Hard fat	5 oz.	4¾ lb.
B	**Corn sirup**	1 lb.	15 lb.
C	**Frappe** (See Formula No. 33)	4 oz.	5 lb.

[1] Contain not more than 1½ per cent butter fat and not over 5 per cent moisture.

Method

Mix the sugar, dry milk solids, and the stabilizer, (CaO, $NaNO_3$, Na_2CO_3, $(NH_4)_2CO_3$ or MgO). Gradually add the water to form first a paste; then a semi-liquid. Set batch on fire or steam kettle, heat slowly, and bring to boil. Add hard fat.

When batch boils vigorously, or at about 225 deg. F., add B and continue boiling.

Some candy makers add corn syrup gradually from 225 deg. F. on.

Add C when batch reaches desired firmness.

FORMULA NO. 35

Chocolate Cream Centers

Unit	Ingredients	Test Batch	Production Batch
A	**Stock fondant** (See Formula No. 24)	2 lb.	40 lb.
B	**Sugar**	1 lb.	20 lb.
	Dry milk solids [1]	3 oz.	4 lb.
	Stabilizer		2½ grams
	Water	½ pt.	5 qt.
	Corn sirup	2 oz.	2½ lb.
C	**Frappe** (See Formula No. 33)	4 oz.	5 lb.

[1] Contain not more than 1½ per cent butter fat and not over 5 per cent moisture.

Method

Place stock fondant or "cream" in remelting kettle. Gradually heat and remelt this cream.

B is the sirup batch or "bobtail" or, as it is usually called, the "bob". Mix the sugar, dry milk solids, and stabilizer, (CaO, $NaNO_3$, Na_2CO_3, $(NH_4)_2CO_3$ or MgO). Gradually add the water, cook to 218 deg. F., then add the corn sirup. Cook to 222 deg. F. and add to A.

After B has been mixed into A, add C and mix in thoroughly. Add vanilla flavor to taste and cast into dry starch.

Many different formulas can be built from this basic cream center formula by adding more or less dry milk solids to the "bob" or by increasing the amount of corn sirup in the "bob". As the amount of corn sirup is increased, the cooking of the "bob" must be increased.

FORMULA NO. 36

Marshmallow Fluff (Stock)

Boil to 230 deg. F., then remove from fire:

Corn sirup unmixed (glucose)	**3 lb. 8 oz.**
Granulated sugar (sucrose)	**3 lb. 8 oz.**
Water	**14 oz.**

Add to the above, then place in a clean beating bowl:

Corn sirup unmixed (glucose)	**2 lb. 8 oz.**
Standardized invert sugar	**1 lb.**

Dissolve—add to above, then beat until stiff on *medium* speed:

Water	**13 oz.**
Egg albumen, tasteless	**4½ oz.**
Vanilla extract (pure)	**½ oz.**
Salt	**¼ oz.**
Cream of Tartar	**¼ oz.**

Fill into containers for storage. This fluff spreads easily. It never gets tough or rubbery.

Formula from Parker-Broeg, Boston

FORMULA NO. 37

Cheese Filling

Cottage cheese	**5 lb.**
Butter	**½ lb.**
Flour (general purpose)	**½ lb.**
Whole eggs	**1½ lb.**
Salt	**¼ oz.**
Dry milk solids	**2 oz.**
Lemon flavor	**to taste**
Egg whites	**1½ lb.**
Sugar	**1½ lb.**
Water	**1 lb. (Approx.)**

Put cheese through coarse sieve. Rub cheese, butter, and flour together. Add egg yolks, salt, dry milk solids, and lemon flavor. If sugared yolks are used instead of whole eggs, cut weight of eggs to 1 lb.

Beat egg whites and sugar to stiff meringue and add to mixture. Quantity of eggs used will determine quantity of water needed to give filling the desired consistency. Stir well befoure pouring into cheese cake pan. Sprinkle with cinnamon.

When desired, layer of spiced and sugared dry bread crumbs can be substituted for the layer of basic sweet dough in bottom of baking pan.

Bake at medium heat, (300 to 350 deg. F.). If oven is too hot the cheese filling will crack. Cracking may be prevented by drawing cake from oven when partially baked and piercing skin on cake surface to let out the excess moisture.

Formula from Dry Milk Institute

FORMULA NO. 38

Cheese Cake (Light)

Cream 5 minutes on medium speed:

Firm, dry bakers' cheese	**8 lb.**
Shortening	**4½ oz.**
Butter	**4½ oz.**
Bread Flour	**1 lb. 2 oz.**
Salt	**1 oz.**

Add gradually:

Whole eggs	**1 lb. 8 oz.**
Vanilla (pure)	**1 oz.**
Lemons (gratings)	**4**

Mix together and add slowly to produce a medium stiff paste:

Water	**4 lb.**
Milk powder, less than 1½ per cent fat	**1 lb. 4 oz.**

Meanwhile, beat stiff:

Egg white	**3 lb.**

Add to beaten egg white, gradually, just before adding boiled sirup:

Granulated sugar	**6 oz.**

Boil sirup given below to 240 deg. F. Add to beaten whites. Beat stiff.

Granulated sugar	**3 lb.**
Water	**12 oz.**

Fold one-half of meringue into cheese. Mix well using wire whip. Fold last half in carefully but well. Mixture must be smooth—no egg-white lumps; they cause holes.

Scale 3¾ lb. to 4 lb. in crumb lined 12x3½ in. round pan (slanting side milk pan).

Bake at 385 to 400 deg. F. for 45 minutes to 1 hour. Cool bottom, or double pans. Turn upside down when 15 minutes out of the oven.

Formula from Parker-Broeg, Boston

FORMULA NO. 39

Basic Fondant

Basic fondant is a smooth cream fondant preparation which is used in nearly every department of the candy factory. Basic fondant is used in cast cream centers of all types, crystallized creams, fudge, cast caramels, nougat, coconut work, icings and grained or semi-chewing candies.

The following formula for basic fondant can be produced in large or small batches on any type of equipment, and it will produce a smooth, creamy textured fondant that may be stored for long periods without prematurely drying.

80 lb	**Granulated sugar**
20 "	**Corn sirup**
10 "	**Standardized invert sirup**
	Water—to dissolve the sugar

Heat all together stirring the batch occasionally until it boils, then wash down all grains of sugar that adhere to the inside of the kettle and boil the batch rapidly to 238-248 deg. F. Cool the resulting sirup to 125-110 deg. F., then beat into fondant.

For cast cream centers: Boil the basic fondant to 238–244 deg. F.

For fudge, nougat, caramels and coconut work: Boil the basic fondant to 244–248 deg. F.

This formula was obtained from the Nulomoline Co., New York

FORMULA NO. 40

Caramel Sirup for Fountain Use

Unit	Ingredients	Test Batch	Production Batch
A	**Sugar (granulated)**	**1 lb.**	**10 lb.**
	Dry milk solids[1]	**6 oz.**	**3¾ lb.**
	Water	**9 oz.**	**5½ lb.**
	Stabilizer	**1 gram**	**10 grams**
B	**Corn sirup**	**1 lb.**	**10 lb.**
C	**Salt**		**to taste**
	Vanilla		**to taste**
	Butter		**to taste**

[1] Contain not more than 1½ per cent butter fat and not over 5 per cent moisture.

Method

Mix the sugar and dry milk solids and stabilizer, (CaO, $NaNO_2$, Na_2CO_3, $(NH_4)_2CO_3$, or MgO). Then gradually add the water, forming first a paste, then a semi-liquid mass.

Add B when batch commences to to boil.

Cook batch until 218–220 deg. F. Then add C.

Some candy makers prefer to add the corn sirup just before batch is finished. They claim batch is more tender than when added at beginning of boil.

FORMULA NO. 41

Cane and Maple Sirup

Maple sirup	**15 gal.**
Water	**28 gal.**
Corn sirup	**3 gal.**
Sugar (sucrose)	**435 lb.**
Maple flavor (imitation)	**2 oz.**

Mix and heat to 219 deg. F.

The maple sirup used is usually one of the dark grades. This product may also be made with maple sugar, using 8 lb. of sugar to each gallon of maple sirup, and making up the difference in volume with water.

Formula from David Algie

Books

New Buyers' Guide Edition

CHEMICAL ENGINEERING CATALOG 1939. Published by Reinhold Publishing Corp., 330 W. 42d St., New York, N. Y. 1,026 pages; 8¾ x 11¼ in.; cloth. Free to those with responsible positions in the chemical industry in the United States and Canada, $3 to those in other countries and to those in United States and Canada for permanent possession; $10 to others.

Now in its 24th annual edition, this catalog contains the customary material, plus sixteen pages of nomographs and charts. These pages, a new feature, include such elements as a humidity chart, charts on pumping costs and pump capacities, a table of friction of water in pipes, a pipe flow chart, thermal expansion of some commercial glasses, data for belt conveyor design, a motor application chart, tube data and fuel losses in coal and oil fired plants.

The principal departments are an alphabetical index of companies, a trade name index, sections on equipment and supplies, chemicals and raw materials, and technical and scientific books.

This publication has long been recognized as the outstanding buyers' guide in the chemical processing industry.

Keeping Workers Healthy

INDUSTRIAL HEALTH. By C. O. Sappington. Published by Industrial Commentaries, 160 N. LaSalle St., Chicago. 1939. 285 pages; 5¾ x 8¼ in.; cloth. Price, $3.75.

Sickness among industrial employees causes the loss of 933,333 work years annually, according to this book. Each worker loses an average of seven days a year. Which demonstrates the importance of health measures in factories.

Designed to help meet this problem, the book discusses the organization of an industrial health service, health procedures needing greater application in industry, special problems, the administration of industrial health and other factors. Among the things needing greater application are preemployment and periodic examinations, correction of physical defects and first aid to minor illnesses. Special problems include fatigue, posture, noise, nutrition, mental hygiene, absenteeism, recreation, ventilation and illumination.

Of practical value are examination forms and industrial survey forms contained in a special section at the end of the book.

Chemical Encyclopedia

THE MERCK INDEX. Fifth Edition. Compiled and Published by Merck & Co., Inc., Rahway, N.J., 1939. 1060 pages; 6½x9⅝ in.; cloth. Price, $3.

No introduction of this chemical encyclopedia is necessary among students of chemistry. It has for years been a standard reference work. The new edition, however, contains nearly twice as many pages as the previous one. And among these pages are 5,900 descriptions of individual substances; 4,500 chemical clinico-chemical reactions, tests and reagents; formulas for preparing culture media, fixatives and staining solutions; useful tables; antidotes for poisons; literature references and other information.

Data on Raw Materials

AGRICULTURAL STATISTICS 1939. Published by the United States Department of Agriculture, Washington, D.C. 586 pages; 6 x 9 in.; paper. Price $0.60. For sale by Superintendent of Documents, Washington, D. C.

Presenting information published until 1935 in the statistical section of the Yearbook of Agriculture, this edition contains the most important agricultural statistics of the United States and the world. To take an example, the table on wheat gives the acreage harvested, the production in bushels, the value, the average yield per acre, the farm value, the farm price, the price per bushel at Chicago and Minneapolis, domestic exports, imports, total net exports and percentage of production for net exports for the years 1866 to 1938. Grains, fruits and vegetables, beef cattle, hogs and sheep are covered. Dairy and poultry statistics are given too.

Tips on Government Business

MATTERS OF PROCEDURE UNDER GOVERNMENT CONTRACTS. By O. R. McGuire. Published by Fidelity & Deposit Company of Maryland, Baltimore, 1939. 80 pages; 5¼ x 8¼ in.; paper. Free.

Food processors supplying goods or services to the government may find this work useful. Now in its third edition, the book covers factors pertaining to the bid, the contract and the settlement of claims under government contracts. There are also chapters on the contracting agencies of the United States, contracts with government corporations and government sales.

Chemical Agriculture

GROWING PLANTS WITHOUT SOIL. By D. R. Matlin. Published by Chemical Publishing Co., Inc., 148 Lafayette St., N.Y., 1939. 137 pages; 5¾x8¼ in.; cloth. Price, $2.

Literature on the new science of plant chemiculture continues to accumulate. And because of a possible future effect on food production, those in the food business may want to keep up with it. This book is a practical treatise of the "how-to-do-it" type.

Tables of Food Values

NUTRITIONAL CHARTS. Published by H. J. Heinz Co., Pittsburgh, Pa., 1939. 35 pages; 12 x 9 in.; paper. Free to food chemists and dietitians.

Nineteen nutritional tables and a bibliography are presented between the covers of this eighth edition of the Heinz nutritional charts. This edition includes structural chemical formulas for several vitamins, as well as new and additional information on nutritional significance and sources of supply of vitamins.

Informative Labels Given

HANDBOOK OF INFORMATIVE LABELING. Published by McLaurin-Jones Co., Brookfield, Mass., 1939. 64 pages; 5½ x 8½ in.; paper. Price, 50 cents.

A revised edition, the pocket handbook tells what the Federal Food, Drug and Cosmetic Act means to the manufacturer. But more important from the viewpoint of its title, it discusses the purpose of the informative label, with charts showing the data desired by retailers and consumers. Thirty pages illustrate actual outstanding informative labels. These are not in the food field, but the principles apply.

Study of Milk Test

THE RESAZURIN TEST. By J. M. Frayer. Published by University of Vermont and State Agricultural College, Burlington, Vt. 1939. Bulletin 435. 16 pages; 6 x 9 in.; paper. Free.

The author concludes that the resazurin test has value if properly conducted and interpreted, but that it is not likely to supplant the methylene blue reduction test for raw milk unless the microscope and a microscopist are available to afford diagnostic assistance.

Patents

Vitamin D Concentrate Prepared by Absorbing Vitamin D Content of Organic Solvent Solution Upon Activated Tri-Calcium Phosphate, Washing With an Organic Solvent, and Removing Solvent by Distillation—Sidney E. Miller, Minneapolis, Minn., to General Mills Inc. No. 2,179,560. Nov. 14, 1939.

Bacon Rind Made Into Edible Products by Cutting Into Small Pieces, Heating Under Pressure to Reduce Particle Sizes One-Half Without Jellying, Deep Fat Cooking and Drying—George A. Darrow, Los Angeles, Calif. No. 2,179,616. Nov. 14, 1939.

Bread Dough Shaped Into Continuous Bar Form, Scored Into Loaf Lengths and Run Into Rectangular Pans Open at Both Ends and Top But Attached End to End Forming a Continuous Trough for Baking Loaves of Bread Without End Crusts—Claude A. Roys, Wellesley Hills, Mass. Nos. 2,179,671 and 2, 179,672. Nov. 14, 1939.

Ham or Similar Smoked Meat Fragments Packed Into Cans Containing a Piece of Smoked Meat Rind and Heat Treated to Bind Fragments and Rind Together Into Loaf Form—Charles H. Vogt, to Modern Food Process Co., Philadelphia, Pa. No. 2,179,676. Nov. 14, 1939.

Citrus Fruits Colored by Treating With an Oil Dye Emulsified in Water-Insoluble and Water-Soluble Solvents at a Temperature Between 90 and 100 Deg. F.—Longfield-Smith, Babson Park, Fla., to Mrs. B. C. Skinner, Dunedin, Fla. No. 2,176,762. Nov. 14, 1939.

Heat Exchange System for Milk, Beer Wort, and the Like Made up of Groups of Relatively Flat Elements Arranged in Parallel Relation to Each Other With Narrow Intervening Spaces, an Inlet Flue and a Relatively Wide and Shallow Nozzle at the Outlet End of Inlet Flue—Harry G. Mojonnier, Oak Park, Ill., to Mojonnier Bros. Co. No. 2,179,949. Nov. 14, 1939.

Meat Pickled Preliminary to Smoking by Soaking in Brine Solution With Addition of Saltpeter by Injection and Centrifuging Meat Wrapped in Narrow Mesh Cloth for Removal of Excess Brine; to be Reused—August Nietiedt, Magdeburg, Germany. No. 2,180,165. Nov. 14, 1939.

Ice Cream Shaped Into Rectangular Units in Bulk Cartons During Freezing to Permit Dispensing From Cartons in Units of Pre-Determined Contour—Homer W. Ohlhaver, River Forest, Ill., to Marathon Paper Mills Co., Rothschild, Wis. No. 2,180,298. No. 14, 1939.

Fish Oils Subjected to Molecular Distillation for Concentration of Fat Soluble Vitamins—Kenneth C. D. Hickman, Rochester, N. Y., to Distillation Products Inc., Rochester, N. Y. No. 2,180,356. Nov. 21, 1939.

Fruit Graded to Size by Mechanical Means—Fred Stebler, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,180,559. Nov. 21, 1939.

Fruit Stemmed by Mechanical Means—William E. Urschel, Valparaiso, Ind. No. 2,180,567. Nov. 21, 1939.

Meat Cured by Applying Curing Agent in Paste Form—Walter M. Urbain to Industrial Patents Corp., Chicago, Ill. No. 2,180,750. Nov. 21, 1939.

Flavorings Made by Dissolving Aromatics in Ethyl Glycerine—Frits E. Stockelbach, Verona, N. J. No. 2,180,932. Nov. 21, 1939.

Starch Particles Dried by Dropping Counter Current to Flow of Hot Gas Under Slight Suction—Helmut Schorn, Dillingen-Saar, and Carl Victor Daumas, Dusseldorf, Germany, to N. V. "Agratherm," Amsterdam, Netherlands. No. 2,180,968. Nov. 21, 1939.

Milk Dried to Give Powder Free From Strong Alkali and Having Calcium Content in Combination to Form Compound Less Soluble in Water Than Tri-Calcium Phosphate—Harold K. Salzberg, Pittsburgh, Pa., to Borden Co., New York, N. Y. No. 2,181,003. Nov. 21, 1939.

Milk Powder Having Calcium Content in Combination to Form Compound Less Soluble in Water Than Tri-Calcium Phosphate Used as Binder in Foundry Core Mixture—Harold K. Salzberg, Pittsburgh, Pa., to Borden Co., New York, N. Y. No. 2,181,004. Nov. 21, 1939.

Puffed Cereals Given a Glaze-Like Coating of Hardened Candied Sirup Preparatory to Covering With Chocolate—Mary N. Dodge, Studio City, Calif. No. 2,181,109. Nov. 21, 1939.

Bakery Products Baked in Multi-tier Oven Heated by Steam From Boiler and Furnace Beneath Baking Chamber—Albert Horlebeck and Clemens Wiesmann, Wuppertal-Barmen, Germany. No. 2,181,130. Nov. 28, 1939.

Dry, Non-Caking Whey Powder Made by Coagulating Major Portion of Whey Proteins Before Crystallizing Lactose—David D. Peebles, San Francisco, Calif. and Paul D. V. Manning, Berkeley Woods, Calif., to Western Condensing Co., San Francisco, Calif. No. 2,181,146. Nov. 28, 1939.

Juice From Citrus Fruits Extracted by Centrifugal Force—Albert R. Thompson, Los Gatos, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,181,218. Nov. 28, 1939.

Molded Pickled Food Loaf Made in a Continuous Manner by a Three Step Method—Leslie J. Kelly, William G. Mueller, and Vernon L. Brunette, to Green Bay Food Co., Green Bay, Wis. No. 2,181,239. Nov. 28, 1939.

Molasses Used as a Mash Substrate Containing 4.59 to 8.52 Per cent Sugar by Weight for Clostridium saccharobutyricum to Make Butyric Acid—Rafael Arroyo, Rio Piedras, P. R., to Borlinquen Associates Inc., San Juan, P. R. No. 2,181,310. Nov. 28, 1939.

Sucrose and Invert Sugars Used in Mash Substrate Having 6.5 Per cent of Sugar by Weight for Clostridium saccharobutyricum to Produce Butyric Acid—Rafael Arroyo, Rio Piedras, P. R., to Borlinquen Associates Inc., San Juan, P. R. No. 2,181,311. Nov. 28, 1939.

Whole Cereals Steeped at Less Than Cooking Temperature for Gelatinization of Starch, Dried and Separated Into Non-Adherent Grains Preparatory to Puffing—John L. Kellogg, to New Foods Inc., Chicago, Ill. No. 2,181,372. Nov. 28, 1939.

Citrus Fruit Peel Diced, Separated From Rag and Washed by Mechanical Means Preparatory to Glazing—Charles Lachman, to S. and W. Fine Foods, Inc., San Francisco, Calif. No. 2,181,514. Nov. 28, 1939.

Decaffeinated Tea Treated to Put Tannin Into a Combination Which Will Not Injuriously Effect the Taste or Odor of the Tea—Theodor Grethe, Hamburg, Germany. No. 2,181,549. Nov. 28, 1939.

Vegetable and Animal Oils Refined by Using a Cooling Step Between the Saponification of the Fatty Acids and the Separating of the Oils From the Undissolved Soaps—Olof Einar Fröding, Stockholm, Sweden, to The De Laval Separator Co., New York, N. Y. No. 2,181,563. Nov. 28, 1939.

Water-Soluble Anti-Oxygens Containing Water-Soluble Carbohydrates, Organic Nitrogen, and Phosphorous Compounds Recovered From Unbleached and Unleached Oats, Maize and Barley Flours—Sidney Musher, New York, N. Y., to Musher Foundation Inc., New York, N. Y. No. 2,181,765. Nov. 28, 1939.

Wine Having Tawny Color Without the Sherry Flavor Made From Red-Juiced Foxy-Flavored Grapes by Heating Above Room Temperature But Below 150 Deg. F. and Subjecting to Passage of Large Quantities of Minute Bubbles of a Dispersed Gas Containing Free Oxygen—Donald K. Tressler, Geneva, N. Y., to Cornell Research Foundation, Inc., Ithaca, N. Y. No. 2,181,838. Nov. 28, 1939.

Sherry-Flavored Wine Made From Foxy-Flavored Grapes by Heating to Approximately 135 Deg. F. for a Period of Several Weeks While Passing Through Large Quantities of Minute Bubbles of Gas Containing Free Oxygen—Donald K. Tressler, Geneva, N. Y., to Cornell Research Foundation, Inc., Ithaca, N. Y. No. 2,181,839. Nov. 28, 1939.

Sausage Cased in a Tube of Knitted Fabric Impregnated and Coated with Vulcanized Rubber—Leo A. Goodman, Brooklyn, N. Y., one-half to Marcleph & Co. Inc., New York, N. Y. Nos. 2,181,886 and 2,181,887. Dec. 5, 1939.

Essential Principles Extracted From Hops by Pulverizing, Crushing, and Extracting With Acetone—Lyndon D. Wood, to National Hops Laboratories, Inc., Chicago, Ill. No. 2,181,931. Dec. 5, 1939.

Meat and the Like Forced Into Vertical Side-Walled Topless Cans Under Pressure Without Deforming Container—Stephan L. Komarik, to Griffith Laboratories, Inc., Chicago, Ill. No. 2,181,945. Dec. 5, 1939.

Confection-Like Coating Transferred From Coating Container to Cookie or Biscuit by a Roll Surface During Passage of Cookie or Biscuit Through Coating Machine—Jos. Clark, to Consolidated Biscuit Co., Chicago, Ill. No. 2,182,068. Dec. 5, 1939.

Pies Trimmed as Dough Containing Pie Plates are Mechanically Conveyed—George S. Frost, by Theodora B. Frost, executrix, Baldwin, N. Y. No. 2,182,079. Dec. 5, 1939.

Toasted Pieces of Desired Size and Shape Made From Steamed Soya Flour and Other Ingredients Made Into a Cooked Dough—Rupert G. Gates, Sharon, Mass. one-half to Charles L. Wickersham, Sharpsburg, Pa. No. 2,182,175. Dec. 5, 1939.

Sausage Packaged Into a Casing Made to Have a Layer of Fabric and a Layer of Cellulosic Material With an Intermediate Layer of Viscose Cellulose as a Bond—Charles T. Walter, to Industrial Patents Corp., Chicago, Ill. No. 2,182,188. Dec. 5, 1939.

Whole or Wholesale Portions of Animal Carcasses Wrapped in Brine-Moistened Paper Preparatory to Being Covered by an Outer Wrapping—Beverly E. Williams and Leon L. Cadwell, to Swift & Co., Chicago, Ill. No. 2,182,190. Dec. 5, 1939.

Animal Carcasses Trademarked by Applying Strip of Cellulose Material Bearing Identifying Marks—Andrew S. Hartanov, to Swift & Co., Chicago, Ill. No. 2,182,203. Dec. 5, 1939.

Dried Egg Given Higher Emulsifying Power By Addition of Glyceryl Ester of a Higher Fatty Acid Containing a Free Glyceryl Alcohol Group—Roy C. Newton and Leon D. Mink, to Industrial Patents Corp., Chicago, Ill. No. 2,182,209. Dec. 5, 1939.

Finely Ground Meat Extruded Through Heated Forming Tube to Make Casingless Sausages—Levi Scott Paddock, to Industrial Patents Corp., Chicago, Ill. No. 2,182,211. Dec. 5, 1939.

Labels Attached to Wax Coated Surface of Cheese by Peg-Like Wax Bonds—Clinton H. Parsons, Chicago, Ill., to Industrial Patents Corp., Chicago, Ill. No. 2,182,212. Dec. 5, 1939.

Glyceride Oils Consisting of Fatty Acid Radicals Containing From 6 to 18 Carbon Atoms Heated With Free Fatty Acids Containing More Than 6 But Not Over 18 Carbon Atoms Undergo Chemical Changes for the Replacement of the Fatty Acid Radicals of Low Carbon Atoms by the Radicals of the Added Fatty Acids—George Barsky, New York, N. Y., to Wecoline Products Inc., Boonton, N. J. No. 2,182,332. Dec. 5, 1939.

Cream Deodorized by Pre-Heating and Mixing With Super-Heated Steam Under Substantial Pressure With Release of Pressure to Permit Steam and Volatile Gasses to Escape Into Open Chamber—Elmer M. Davis to Industrial Patents Corp., Chicago, Ill. No. 2,182,335. Dec. 5, 1939.

Fruit and Vegetable Units Subjected to Blast of Cooled Air to Form a Frozen Outer Crust Preparatory to Moving Through a Refrigerant by a Tumbling Agitating Movement—Donald W. Griswold, Bridgeton, N. J. No. 2,182,556. Dec. 5, 1939.

Beta-Lactose Made From Other Forms of Lactose by Heating Above the Transition Point and to a Vapor Pressure Sufficient for Formation of Beta Forms With Subsequent Removal of Released Water Vapors—Paul Francis Sharp and David Birney Hand to Cornell Research Foundation, Inc., Ithaca, N. Y. Nos. 2,182,618 and 2,182,619. Dec. 5, 1939.